LAND PEATE
VIIRS
Science Data Processing Software
System Description
Version 1.2

Revision B

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LAND PEATE VIIRS Science Data Processing Software System Description Version 1.2

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Original	11/01/05	All	Review
Baseline	11/23/05	Revised 3.3, minor changes to several sections, added Appendix D.	Baseline Version 1.0
Revision A	09/19/06	All: Land PEATE revisions, addition of descriptions of all known launch-ready PGEs, addition of VIIRS data processing details, changes required by updates to EDRIR, NPPDAPS revisions, interface changes, added sections to describe gridded and aggregated products, DDRs, naming conventions, metadata, and use of the Wrapper for Operations Code.	Revision A Version 1.1
Revision B	09/26/07	Sections affected by Land PEATE's integration of Build 1.4 Operations Code and changes in Land PEATE requirements.	Revision B Version 1.2

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LAND PEATE VIIRS SCIENCE DATA PROCESSING SYSTEM DESCRIPTION VERSION 1.2

1 INTRODUCTION

1.1 Purpose and Scope

The Land PEATE VIIRS Science Data Processing Software System Description document provides a description of the structure and high-level workings of the Visible Infrared Imaging Radiometer Suite (VIIRS) science data processing software that will be run by the National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP) Data Processing System (NPPDAPS) in support of the Land Product Evaluation and Test Element (PEATE) and the NPP Instrument Calibration Support Element (NICSE). The Land PEATE and NICSE are components of the Science Data Segment of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP). This document provides a description of the VIIRS algorithm chains and science product data flows in NPPDAPS and descriptions of the individual algorithms within the chains that will be run for the Land PEATE. The descriptions include inputs, outputs, and production rules for the algorithms. It will also provide tables and data flow diagrams of algorithm dependencies in NPPDAPS, science product descriptions, and brief descriptions of support provided by Land PEATE groups.

1.2 Background

NPP is a joint mission among the NPOESS Integrated Program Office (IPO), the National Oceanic and Atmosphere Administration (NOAA), and the National Aeronautics and Space Administration (NASA). The purpose of the mission is to provide NASA with the continuation of global change observations that began with the Earth Observing System (EOS) Terra, Aqua, and Aura Satellite Missions. It will also provide the NPOESS operational community, including NOAA and DOD, with a pre-operational risk reduction demonstration and validation for selected NPOESS instruments, science algorithms, and ground processing.

The instruments onboard the NPP Satellite are the following:

- Visible Infrared Imaging Radiometer Suite (VIIRS) that will provide global observations of atmosphere, land, and ocean parameters.
- Advanced Technology Microwave Sounder (ATMS) that will measure atmospheric temperature and moisture profiles.

- Cross-Track Infrared Sounder (CrIS) that will measure infrared atmospheric temperature, moisture, and pressure profiles.
- Ozone Mapping and Profile Suite (OMPS) that will monitor global ozone levels.

The primary types of science data products to be generated for these instruments are the following:

- Raw Data Record (RDR)
- Sensor Data Record (SDR)
- Environmental Data Record (EDR)
- Application Related Product (ARP)
- Intermediate Product (IP)

The NPP Mission is composed of several support segments that interact to accomplish the goals of the mission. These segments and their interfaces are shown in Figure 1-1 and their mission functions are listed below.

- Launch Support Segment (LSS) – Provide support for the NPP launch vehicle, the launch itself, and the payload processing.
- Command, Control, and Communication Segment (C3S) – Manage the NPP Mission for the joint program operational needs; provide NPP satellite operations capabilities including mission planning and scheduling; provide communications between ground and space including coordination of network links; and routing mission data to polar ground stations.
- Interface Data Processing Segment (IDPS) – Ingest raw sensor data, remove artifacts, and produce validated RDRs; process RDRs to produce SDRs, EDRs, and IPs; provide operational level calibration and validation; and distribute RDRs, SDRs, EDRs, and selected IPs to Meteorological Centrals (National Environmental Satellite Data Information Service (NESDIS) and Air Force Weather Agency (AFWA)). NESDIS distributes the products to the Archive and Distribution Segment (ADS). and the Science Data Segment (SDS).
- Archive and Distribution Segment (ADS) – Ingest, validate, and archive RDRs, SDRs EDRs, selected IPs, other related data products, and operational source code into its Long-Term Archive; maintain the archive; distribute products to the Science Data Segment at high-priority and to other users; generate user products, and generate accounting reports.
- NPOESS Science Investigator-led Processing System (NSIPS) - Store analysis data used for calibration and validation of NPP and NPOESS data products, retained IPs, calibration coefficients and validation results; and distribute these data to the Science Data Segment and other calibration and validation members.

- Science Data Segment (SDS). - Provides capabilities to assess and verify quality of EDRs it receives from ADS for climate research; acquire and assess quality of RDRs it receives from IDPS and SDRs and EDRs it receives from ADS; use a fully interoperable architecture to provide communication among its component elements, support them in their activities, and provide interface support with other NPP Mission Segments; and provide suggested algorithm improvements to IDPS.

The SDS is composed of the SDS Data Distribution and Depository Element (SD3E), the Integration and Test System Element (I&TSE), the Project Science Office Element (PSOE), the NPP Instrument Calibration Support Element (NICSE), and five Product Evaluation and Test Elements (PEATEs) for the Land, Ocean, Atmosphere, Ozone, and Sounder disciplines. The context diagram, functional requirements, and interfaces for NPP elements are discussed under Section 3.1 in the System Architecture Chapter of this document.

The Land PEATE will be one of the important groups that fulfill the NPP Mission's goal of continuing the evaluation of science products that are main sources of the global change observations that began with the MODIS Land data from the Terra and Aqua satellites. The primary task of the Land PEATE is to assess the VIIRS EDRs made by IDPS using the Operational Code and to recommend any improvements needed to the algorithms in the Operational Code to make the EDRs equivalent to Climate Data Records (CDRs). The Land PEATE will be using proxy data (produced by mapping MODIS bands into the nearest VIIRS band) for pre-launch, input test data for the VIIRS algorithms. During the NPP Mission the Land PEATE will be comparing MODIS and other data with the VIIRS data from NPP. This document provides a description of the VIIRS algorithm processing, production rules, data ingesting, data archiving, algorithm testing, and data distribution support provided by the Land PEATE.

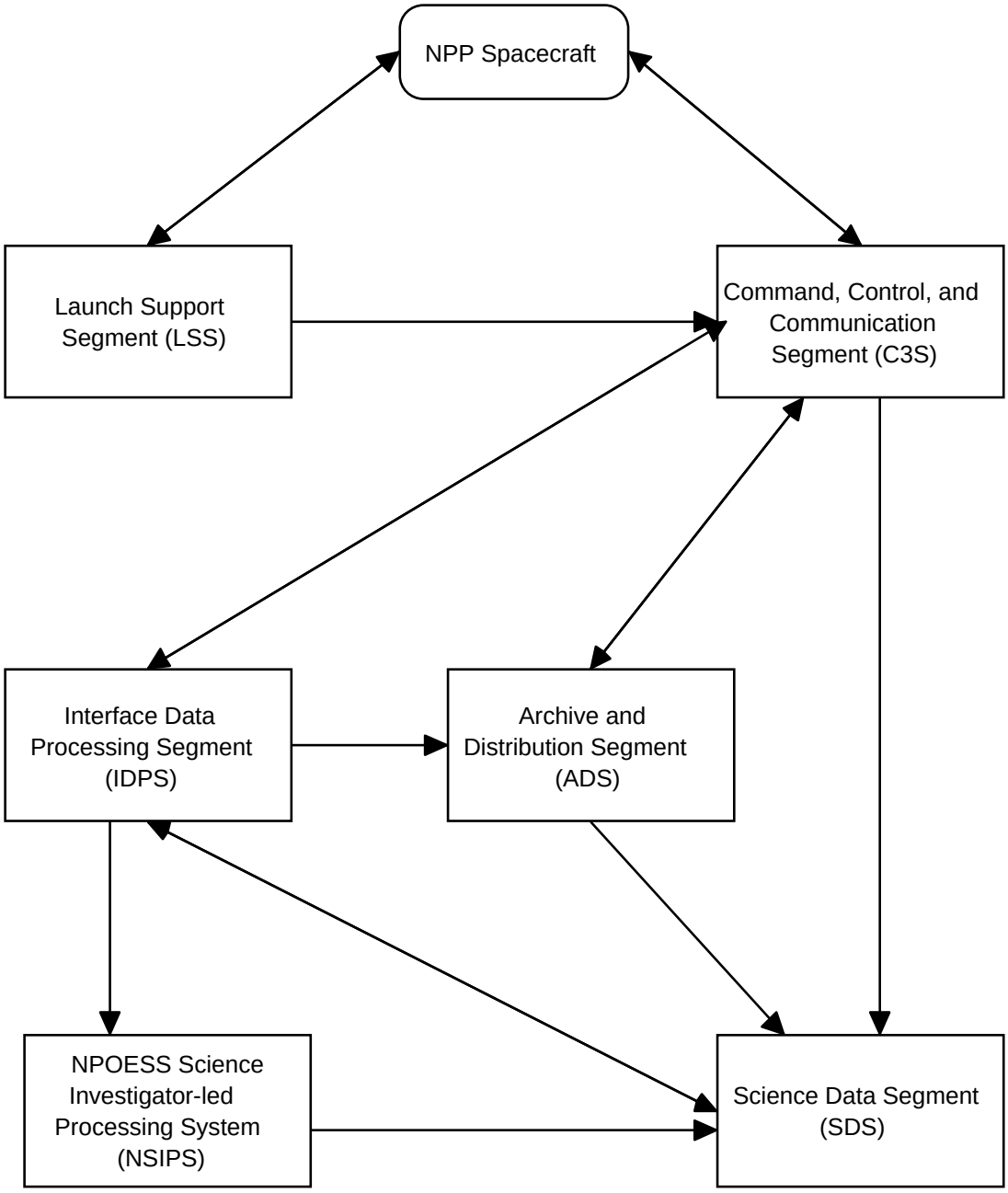


Figure 1-1 NPP Mission Context Diagram

2 RELEVANT DOCUMENTS

2.1 Parent Documents

- National Polar-Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) Science Data Segment Requirements Specification, GSFC 429-05-11-01, April 7, 2005
- NPP EDR Production Report, Rev. 1.8, NO. D37005, March 28, 2006
- Land PEATE VIIRS Science Data Processing Software System Description Version 1.1, NPP_002, September 19, 2006

2.2 Applicable Documents

- National Polar-Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) Science Data Segment Operations Concept, GSFC 429-05-11-02, April 7, 2005
- EDR Interdependency Report, Rev. A, Draft 15, June 30, 2006
- Performance Specification Sensor Specification for the Visible/Infrared Imager Radiometer Suite (VIIRS), February 3, 2004
- NPOESS Common Data Format Control Book – External Volume I – Overview, NO. D34862 – 01, Rev. A, October 14, 2005
- NPOESS Common Data Format Control Book – External Volume IV – Part I – IPs, ARPs, and Geolocation Data, NO. D34862 – 04 - 01, Rev. A, October 21, 2005
- NPOESS Common Data Format Control Book – External Volume IV – Part III– Land and Ocean/Water EDRs, NO. D34862 – 04 - 03, Rev. A, October 21, 2005
- NPOESS Common Data Format Control Book – External Volume V – Metadata, NO. D34862 – 05, Rev. A, August 11, 2006

3 SYSTEM ARCHITECTURE

3.1 Interfaces of Land PEATE VIIRS Data Processing to NPP Mission Segments and Other Elements of Science Data Segment

The Land PEATE is one of the elements of the NPP Science Data Segment (SDS). The Land PEATE will perform the VIIRS science data processing in order to evaluate the quality of the VIIRS data generated by the NPP Operational System, enhance the science algorithms, and recommend improvements to the algorithms used in the operational code. The interfaces of the Land PEATE VIIRS data processing to external NPP Mission Segments and to other Elements within the Science Data Segment (SDS) are shown in Figure 3-1.

The figure reflects both the interfaces described in the NPP Science Data Segment Requirements Specification, GSFC 429-05-11-01 (Section 2.0) and subsequent updates for the interface that replaced the earlier NPP Engineering development unit eXchange Toolkit (NEXT) with the NOAA Observatory System Architecture (NOSA) group that maintains the CasaNOSA web site and handles the interface for sending and receiving NPP Operational Algorithm Code and test data. The figure shows only the primary interfaces for the Land PEATE, not all interfaces for the other PEATEs and external groups.

The primary purpose of the SDS is to act as a research tool to evaluate the NPP science algorithms and data products and make recommendations to the Operational System to improve the operational algorithms. The descriptions for most of the external interface data providers have been listed in Section 1.2. The following list contains a high level description of each element within the SDS and the external CasaNOSA.

- SDS Data Depository and Distribution Element (SD3E) – Performs data acquisition from the IDPS and ADS, including data acquisition protocols and procedures for getting the data and resolving any anomalies according to the Interface Control Documents; provides temporary local storage for a minimum of 32 days of acquired data; makes the acquired data accessible to all SDS internal elements; and maintains the electronic network connectivity to IDPS and ADS.
- Project Science Office Element (PSOE) – Provides management direction, mission guidance, and science guidance to the SDS; reviews algorithm and calibration recommendations prior to submitting them to the NPP/NPOESS Algorithm CCB.

- NPP Instrument Calibration Support Element (NICSE) - Accesses and validates both pre-launch and post-launch radiometric and geometric calibration and characterization of VIIRS instrument data; evaluates and makes recommendations for enhancements of the calibration software and associated Look-up Tables (LUTs); and makes requests to the PEATEs to test calibration improvements in their environments before submission to the PSOE.
- Product Evaluation and Test Elements (PEATEs) - Make data requests to SD3E; extract data of interest to their systems from ADS for products quality evaluation, selected subset processing, and algorithm enhancements; coordinate with NICSE to submit their recommendations to the PSOE; make requests to the Integration & Test System Element to evaluate performance of algorithm or calibration enhancements; work with the Science Team to achieve their objectives; run science tests on algorithms enhanced by the Science Team to compare output products to products from Operational Algorithms; and get alternative external ancillary data from ADP.
- Integration and Test System Element (I&TSE) - Facilitate access to a smaller scale IDPS production system to test algorithm enhancements, produce intermediate products, demonstrate algorithm performance, perform ad-hoc data processing requests; and provide support for converting and running algorithms.
- CasaNOSA - Maintains the CasaNOSA web site; handles the interface for providing NPP Operational Algorithm Code and test data from IDPS to the Land PEATE; handles the interface for receiving recommended, updated Operational Algorithm Code and test data from the VIIRS Science Team, Land PEATE, and NICSE; makes decisions and handles the interface for sending the recommended, updated Operational Algorithm Code to the IDPS I&T for eventual updates to the Operational Code that IDPS is running.
- NPOESS Science Investigator-led Processing System (NSIPS) - Orders and obtains the Retained IPs required by the PEATEs and exports them to SD3E for access by the PEATEs.

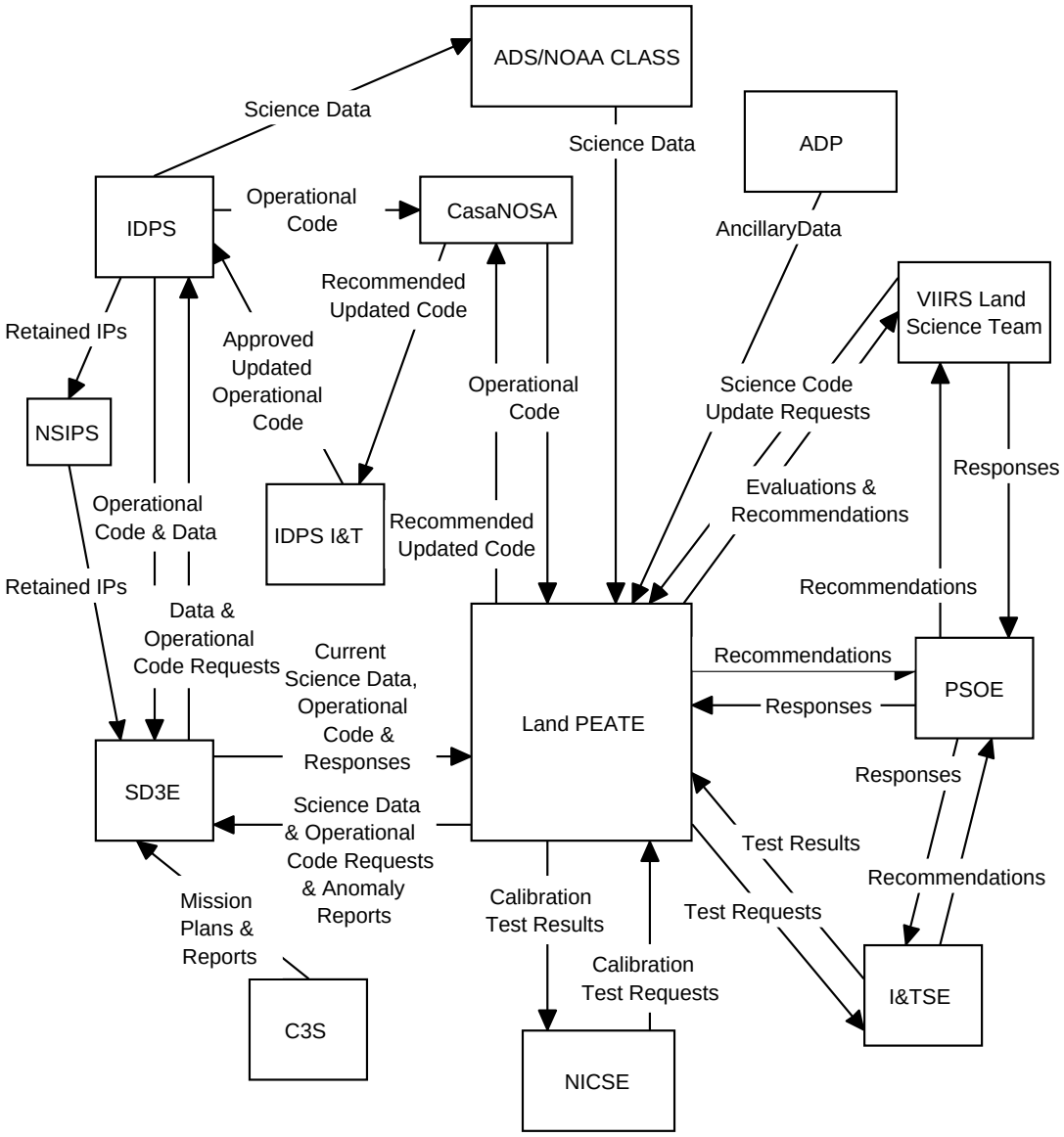


Figure 3-1 Interfaces of Land PEATE with SDS Elements and External Segments

3.2 Instrument Data

The Visible Infrared Imager Radiometer Suite (VIIRS) consists of nadir-viewing and cross-track observing sensors that record imagery and radiometric data over a wide range from the visible to infrared wavelengths. VIIRS is designed to measure the radiation at high resolution to provide radiometric accuracy comparable to the Advanced Very High

Resolution Radiometer (AVHRR) and high spectral resolution of the Operational Linescan System (OLS).

VIIRS will measure many types of atmospheric, cloud, land surface, and water surface data. The products to be generated from VIIRS data include many types of land and atmospheric parameters to be evaluated by the Land PEATE. Some of these parameters are land surface reflectance, land surface temperature, land albedo, surface type, vegetation index (VI), bidirectional reflectance distribution function (BRDF), active fires, snow/ice cover, ice surface temperature, ice age, ice quality, cloud mask, and aerosol particles.

3.2.1VIIRS Sensor Bands

VIIRS will have 6 spectral bands in the visible (VIS), 3 bands in the near-infrared (NIR), a day/night band in the visible, 5 bands in the short-wave infrared (SWIR), 3 bands in the mid-wave infrared (MWIR), and 4 bands in the long-wave infrared (LWIR). The VIIRS sensor bands are shown in Table 3-1. The table lists the center wavelength in nanometers (nm). It classifies the type of radiation as reflective or emissive and the spatial resolution type as moderate (MOD) or imagery (IM).

Table 3-1 VIIRS Sensor Bands

Band Name	Center Wave Length (nm)	Wavelength Type	Radiation Type	Spatial Resolution Type
M1	412	VIS	Reflective	MOD
M2	445	VIS	Reflective	MOD
M3	488	VIS	Reflective	MOD
M4	555	VIS	Reflective	MOD
M5	672	VIS	Reflective	MOD
M6	746	NIR	Reflective	MOD
M7	865	NIR	Reflective	MOD
M8	1240	SWIR	Reflective	MOD
M9	1378	SWIR	Reflective	MOD
M10	1610	SWIR	Reflective	MOD
M11	2250	SWIR	Reflective	MOD
M12	3700	MWIR	Emissive	MOD
M13	4050	MWIR	Emissive	MOD
M14	8550	LWIR	Emissive	MOD
M15	10763	LWIR	Emissive	MOD
M16	12013	LWIR	Emissive	MOD
DNB	700	VIS	Reflective	IM

Band Name	Center Wave Length (nm)	Wavelength Type	Radiation Type	Spatial Resolution Type
I1	640	VIS	Reflective	IM
I2	865	NIR	Reflective	IM
I3	1610	SWIR	Reflective	IM
I4	3740	MWIR	Emissive	IM
I5	11450	LWIR	Emissive	IM

3.2.2VIIRS Detector Footprint Aggregation

VIIRS data aggregation begins at the detector level with the on-board detector footprint aggregation of the single-gain bands during the VIIRS scan. For both the Moderate Resolution data and the Imagery Resolution (High Resolution) data more cross-track samples are aggregated at nadir than at distances farther out in the scan and there is no aggregation at the highest scan angles. Table 3-2 shows the cross-track aggregation information for these data. Information for the DNB and bands that use multiple gain states may be found in the Performance and Sensor Specification for VIIRS document.

Table 3-2 Cross-track Aggregation

Scan Angle $\|\phi\|$	Number of Values Aggregated in Scan	Detectors Transmitted Bands M1 – M16	Detectors Transmitted Bands I1 – I5	Distance from Nadir
$\|\phi\| < 31.59°$	3	1 - 16	1 - 32	At Nadir
$31.59° < \|\phi\| < 44.82°$	2	2 - 15	3 - 30	2028 km
$\|\phi\| > 44.82°$	1	3 - 14	5 - 28	3000km

3.3 Model for VIIRS Science Data Processing for Land PEATE and NICSE

Like the VIIRS science data from the NPP satellite provides a continuation of the MODIS science data from the EOS Terra and Aqua satellites, the VIIRS science data processing will be modeled on the MODIS science data processing. The MODAPS data processing software developed for MODIS data will be used to process the VIIRS data for the Land PEATE and NICSE. This software is being updated to handle the VIIRS

processing. The Land PEATE's processing facility for VIIRS data is called NPPDAPS.

In order to meaningfully compare output of science and operational code, as well as to use operational code results as Science code input, or vice versa, Science and Operational code input and output have been standardized with regard to formats and units insofar as possible. The Land PEATE's system uses HDF4-EOS at this time to facilitate comparison to MODIS products. Land PEATE anticipates moving to HDF5 at some point in the future.

The VIIRS products, ancillary data products, and other products are identified by a ShortName and a LongName that are analogous to the product names used in the MODIS data processing. The standard naming conventions for the ShortName and LongName are based on a combination of the MODIS naming convention and the NPP/NPOESS naming convention.

3.3.1ShortName Standard Convention

The VIIRS ShortName Standard Convention is an extended and modified MODIS convention consisting of the following:

ShortName – NPPDAPS Database identifier, limited to 16 characters, for the Earth Science Data Type (ESDT) consisting of three parts or fields separated underscores. The VIIRS Standard Naming Convention for the ShortName contains the following, ordered fields:

- Satellite ID (NPP, N01, …)
- Data Product ID. The NPOESS Common Data Format (CDF) Control Documents have defined many VIIRS and Ancillary Data Product IDs for the data files. If a file has a Data Product ID defined by NPP/NPOESS, it will be used. Otherwise, one will be created. At the beginning of the Data Product ID daily products will have "D", monthly products will have "M", quarterly products will have "Q", and multi-day products will have "D" + number of days (D8, D16, …).
- Most of the products defined in the CDF document are EDRs, but the characters "EDR" are not included in the ShortName. The IP products will have "IP" as the last two characters in this field to distinguish them from EDRs, particularly those with identical product descriptions.
- Product Processing Level (L0, L1, L2, L3, … for VIIRS IDPS official products, CMG for Climate Modeling Grid products, and ANC for ancillary data

products). However, ancillary data that have been processed through a VIIRS granulation algorithm will have L2 as the processing level.
- Coarse Resolution products will have "C" appended at the end of the processing level. Diagnostic Data Records (DDRs) will have "D" appended at the end of the processing level.

Examples of VIIRS ShortNames are the following:

NPP_VMAE_L1
NPP_VRVI_L2
NPP_CMIP_L2
NPP_SRFLIP_CMG
NPP_D8SRF_L3D
NPP_CMIP_L2C

3.3.2LongName Standard Convention

The VIIRS LongName Standard Convention is an extended and modified MODIS convention consisting of the following:

LongName – A more detailed description, limited to 96 characters, in MODIS standard format, for the ESDT product. The VIIRS Standard Naming Convention for the LongName contains the following, ordered fields:

- Instrument/Satellite ID (VIIRS/NPP, VIIRS/N01, …)
- Brief Product Description (Free text provided by Science Team, software developers, or Land PEATE code integrator)
- Temporal Data Coverage Period in File (In most cases this temporal period will be the same as the processing period.) (5-Min, Daily, 8-Day, 16-Day, 17-Day, Monthly, 32-Day, 96-Day, Quarterly, Yearly, Cont., where "Cont." denotes continuously updated every orbit)
- Processing Level (L0, L1A, L1B, L2, L2G, L3, L4)
- Spatial Data Coverage (Swath, Global, Point)
- NPP Data Type (RDR, SDR, EDR, IP, ARP, DDR, CRS)
- Data Resolution (375m, 750m, 1km, 5km, 0.01Deg, 0.05Deg, …) with additional processing features if applicable (Granulation)
- Grid Type or Map Projection if applicable (SIN Grid, ISIN Grid, EASE Grid, CMG, Equal Area, ISEAG, CylEqDis, Lat/Lon …)
- Day or Night Product Only (Specified when day and night products are made separately or optionally if product made only in one mode: Day, Night).

The following LongNames are examples for the VIIRS IDPS official production products in extended MODIS convention:

- VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
- VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m
- VIIRS/NPP Land Surface Temperature 5-Min L2 Swath EDR 750m
- VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation
- VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km
- VIIRS/NPP Gridded Land Albedo 17-Day 5-Min L2 Swath IP 750m Granulation

The following LongNames are examples for the VIIRS Land PEATE diagnostic data products in extended MODIS convention:

VIIRS/NPP Vegetation Index Monthly L3 Global DDR 0.05 Deg CMG
VIIRS/NPP Surface Reflectance 8-Day L3 Global DDR 10 x 10 Deg SIN Grid
VIIRS/NPP Surface Reflectance 5-Min L2 Swath CRS 5km Lat/Lon

3.3.3VIIRS Land File Name Standard Convention

The File Name Standard Convention for VIIRS Land products is based on the MODIS File Name Standard Convention. NPPDAPS makes use of product file names and character strings within the file names to uniquely identify the specific granules in many places throughout its system. The file names must therefore contain character strings that identify the type of product, the version of the product, the time when the data within the product granule were observed and acquired from the telemetry, and the time when the product granule was generated at the NPPDAPS Facility. Additional information is required for products that are generated as tiles on a projection grid. The Land PEATE is currently writing the product files in Hierarchical Data Format (HDF4-EOS), but the NPP groups, including IDPS, are writing files in HDF5. Eventually Land PEATE will migrate to HDF5. The file name extension for HDF4-EOS is “hdf” and for HDF5 is “h5”. File names in this version of the document will have extensions of “hdf”.

3.3.3.1 Level-1 and Level-2 Product Naming Convention

VIIRS L1 SDRs, L2 Land products, and L2 Atmosphere products are generated as 5 minute swaths of data like MODIS L1 and L2 data. The file names identify the product by ESDT, version, acquisition date and time, and processing date and time of the granule. The Land PEATE L1 and L2 coarse resolution products will be distinguished from the IDPS official products by the “C” at the end of the ESDT

ShortName and the "L" in the Product Version. The format for the file names is the following:

ESDT.**A**yyyyddd.hhmm.LM_N.yyyydddhhmmss.**hdf** where:

- ESDT represents the ESDT ShortName of the product (maximum of 16 characters),
- **A** represents the Acquisition Date,
- yyyyddd represents the four-digit year followed by the 3-digit day number (001-366) within the year, for the start of the granule,
- hhmm represents the time of day applying to the start of the granule, in hours and minutes,
- LM_N represents a ProductVersion string of nine or more characters for the product (see section on VIIRS Data Versioning); length of LM is variable; length of N is fixed at 5 characters, including leading zeroes as necessary,
- yyyydddhhmmss represents the four digit year, 3-digit day number (001-366) within the year, hours, minutes, and seconds of a time at which the granule was processed. These times should be UTC times, not local time zone values,
- **hdf** indicates that this is an HDF 4 file; but most likely it will be "h5" when the out put is HDF 5.

3.3.3.2 VIIRS L3 and L4 Land Tiled and Global Products File Naming Convention

The VIIRS Land Gridded products are described in Section 3.4 and its sub-sections. VIIRS tiles, like MODIS tlles, are produced in the Sinusoidal Projection, but the grid size and thus the numbering of the tiles will be different from MODIS tiles. The range of horizontal and vertical cell numbers for VIIRS tiles is also discussed in Section 3.4. The un-aggregated gridded products with VIIRS-size tile numbers are ingested at NPPDAPS. The VIIRS tiles are then aggregated to MODIS-size tiles with the same horizontal and vertical tile numbers as MODIS tiles. The format for the un-aggregated VIIRS file names is the following:

ESDT.**A**yyyyddd.**h**<nn>**v**<mm>**u**.LM_N.yyyydddhhmmss.**hdf** where:

- ESDT represents the ESDT ShortName of the product (maximum of 16 characters,
- **A** represents the Acquisition Date,
- yyyyddd represents the four digit year followed by 3-digit day number (001-366) within the year, for the start of the granule within the file,

- **h**<nn> indicates a 2-digit tile number (00 – 71) (with leading zeroes as needed) in the horizontal direction for the global grid, and is zero-based,
- **v**<mm> indicates a 2-digit tile number (00 – 71) (with leading zeroes as needed) in the vertical direction for the global grid, and is zero-based,
- **u** represents an un-aggregated VIIRS tile,
- LM_N represents a ProductVersion string of eight or more characters for the product (see section on VIIRS Data Versioning); length of N is fixed at 5 characters, including leading zeroes as necessary,
- yyyydddhhmmss represents the four digit year, day number (1-366) within the year, hours, minutes, and seconds of a time at which the granule was processed. These times should be UTC times, not local time zone values,
- **hdf** indicates that this is an HDF 4 file; but most likely it will be "h5" when the out put is HDF 5.

The format for the file names of the IDPS official VIIRS tiled products aggregated to MODIS-sized tiles is the same as the un-aggregated tiled products except the "u" is not included and the tile range id different, The format for the Land PEATE VIIRS Diagnostic Data Record (DDR) tiled products is the same as for the aggregated VIIRS IDPS official products since the DDRs will be made in MODIS-sized tiles. The DDR products will be distinguished from the IDPS official products by the "D" at the end in the ESDT ShortName and "L" in the Product Version. The format for the aggregated VIIRS file names is the following:

ESDT.**A**yyyyddd.**h**<jj>**v**<kk>.LM_N.yyyydddhhmmss.**hdf** where :

- **h**<jj> indicates a 2-digit tile number (00 – 35) (with leading zeroes as needed) in the horizontal direction for the global grid, and is zero-based,
- **v**<kk> indicates a 2-digit tile number (00 – 17) (with leading zeroes as needed) in the vertical direction for the global grid, and is zero-based.

The format for the VIIRS L2 or L3 global Climate Modeling Grid (CMG) product is very similar to the L1 and L2 product format except that the hour, minute, and second is omitted from the acquisition date and the Product Version contains an "L" for Land PEATE. The format for the file name of the CMG is the following:

ESDT**.A**yyyyddd.LM_N.yyyydddhhmmss.**hdf** where:

- ESDT represents the ESDT ShortName of the product (maximum of 16 characters),
- **A** represents the Acquisition Date,

- yyyyddd represents the four-digit year followed by the 3-digit day number (001-366) within the year, for the start of the granule,
- LM_N represents a ProductVersion string of nine or more characters for the product (see section on VIIRS Data Versioning); length of LM is variable; length of N is fixed at 5 characters, including leading zeroes as necessary,
- yyyydddhhmmss represents the four digit year, 3-digit day number (001-366) within the year, hours, minutes, and seconds of a time at which the granule was processed. These times should be UTC times, not local time zone values,
- **hdf** indicates that this is an HDF 4 file; ; but most likely it will be "h5" when the out put is HDF 5.

3.3.3.3 Examples of File Names

L2 swath product example - the first version of the NPP L2 Surface Reflectance product for January 1, 2009 at 08:30, generated on January 2, 2009 at 5:00:20 am at the Land PEATE would be encoded as follows:

NPP_SRVI_L2.A2009001.0830.P1_00200.2009002050020.hdf

L3 IDPS Official Land VIIRS tiled product example - the second version of the NPP L3 Gridded Surface Type Quarterly product for March 6, 2009, at the 11th horizontal tile and 4th vertical tile, generated at IDPS on February 1, 2010 at 2:26:07 pm and later aggregated at NPPDAPS would be encoded as follows for an un-aggregated and aggregated VIIRS tile:

NPP_QSIP_L3.A2009065.h10v03.u.P1_00200.2010032142607.hdf
NPP_QSIP_L3.A2009065.h05v00.P1_00200.2010033153027.hdf

L3 or L4 Land VIIRS global CMG product example - the second version of the NPP L3 Gridded Global Daily Surface Reflectance product for March 6, 2009, generated at Land PEATE on February 1, 2010 at 2:26:07 pm would be encoded as follows:

NPP_SRFLIP_CMG.A2009065.L1_00200.2010032142607.hdf

L3 Land PEATE VIIRS tiled product example - the second version of the NPP L3 Gridded 8-Day Surface Reflectance DDR product for March 6, 2009, at the 11th horizontal tile and 4th vertical tile, generated by the Land PEATE at NPPDAPS on February 1, 2010 at 2:26:07 pm would be encoded as follows for a MODIS-size VIIRS tile:

NPP_D8SRF_L3D.A2009065.h10v03.L1_00200.2010032142607.hdf

3.3.4Product Generation Executives

The VIIRS science algorithms will be packaged into Product Generation Executives (PGEs) for producing the VIIRS science data products using NPPDAPS. The convention for naming VIIRS PGEs is an extension of the convention for naming MODIS PGEs.

The names for MODIS PGEs are limited to 5 characters.

- "PGE" as the first three characters.
- Two digit number.

The names for VIIRS PGEs are limited to 6 characters with the following format:

- "PGE" as the first three characters.
- Three digit number, beginning with "3" to identify a VIIRS PGE.

When a VIIRS product has analogous MODIS products, the PGE that generates the VIIRS product is assigned the same last two digits. Example of analogous MODIS and VIIRS PGEs are the following:

MODIS	VIIRS
PGE01	PGE301
PGE02	PGE302
PGE11	PGE311

3.3.5VIIRS Algorithm and Software Versioning

The VIIRS science algorithms that are integrated into PGEs for processing at NPPDAPS will be identified and tracked by the Land PEATE Configuration Management (CM) and the NPPDAPS Production System using several types of versions. The versioning attributes can be used to trace an algorithm back to its original source, identify changes made to enable it to run under NPPDAPS, and to evaluate its products at any stage. The versioning attributes will be written by PGEs into products made at NPPDAPS and evaluated by the Land PEATE.

3.3.5.1 Algorithm Type

The Algorithm Type identifies the source of the algorithm code that was obtained from the CasaNOSA web site and ingested to the Land PEATE CM repository. NGST Science Team (SCI) Code and IDPS Operations (OPS) Code may be downloaded

from this site. Current IDPS Operational Algorithm code may also be obtained from SD3E.

Database FieldName: AlgorithmType
Definition: Identifies source of algorithm code as NGST Science Code (SCI), IDPS Operations Code (OPS), NASA Science Team (ST) Code, Land PEATE Code (LP) for DDRs, CMGs, or Coarse Resolution Products)
Format: Text ("SCI", "OPS", "ST", "LP")
Example: SCI
Information Source: Land PEATE Integration Team
Where Stored: Hard-coded in PGE Perl script and written in Process Control File (PCF)

3.3.5.2 PGE Version

The PGE Version identifies the version of the PGE containing the algorithm code that runs at NPPDAPS. One or more algorithm processes may be packaged in the PGE. The VIIRS PGE Version has many of the features of the MODIS PGE Version.

Database FieldName: PGEVersion
Definition: Version of the basic NPPDAPS software unit for running one or more processes, including the control scripts and support files needed to run the process in the system.
Format: A.B.C.D
A: PGE Type (C = SCI Code, P = OPS Code, D = DDR Code, CMG Code, or Coarse Resolution Product Code)
B: PEATE build number
C: Algorithm increment (if one or more processes or PGE components contain an algorithm change)
D: System increment (if one or more processes or PGE components contain a system change)

Example: P.2.10.4
Information Source: Land PEATE CM & Land PEATE Integration Team
Where Stored: NPPDAPS database table: PGE_Def.PGEVersion (written to parameter file at runtime)

3.3.5.3 PEATE Algorithm Version

The PEATE Algorithm Version identifies the version of an individual algorithm or process that runs within a PGE under NPPDAPS at the Land PEATE facility. This version number tracks changes made at the Land PEATE back to the original algorithm or process. Code obtained from CasaNOSA under Subversion (SVN) has a revision number that is automatically assigned by SVN. The Science Team may modify NGST SCI Code

or OPS Code to make versions that have improved algorithms and send them to Land PEATE for testing and evaluation. However, after IDPS makes the first version of the OPS Code available to the Land PEATE, the Science Team is expected to modify only the OPS Code for delivery to Land PEATE for testing and evaluation.

Database FieldName: PEATEAlgorithmVersion
Definition: Version of the algorithm (or process) that generates one or more products. Several processes may be bundled in a PGE. The version number ties algorithm changes (science changes or other changes) back to algorithm downloaded from CasaNOSA. Several processes may be listed in the metadata field if the processes produce intermediate products that are deleted from the system
Format (for SCI code): Name X.Y
Name: Process name
X: CasaNOSA revision number for Science algorithm code
Y: Science modification increment
Format (for OPS code): Name X.X.Y
Name: Process name
X.X: IDPS build number for Operations code, as listed on CasaNOSA or provided by SD3E
Y: Science modification increment
Format (for Science Team (ST) code): Name X.Y.Z
Name: Process name
X: PEATE build number
Y: Science modification increment
Z: Land PEATE system modification increment
Format (for Land PEATE (LP) DDR, CMG, or Coarse Product Code): Name X.Y
Name: Process name
X: PEATE build number
Y: Land PEATE system modification increment
Examples:
SCI code: NPP_PRwcalc 498.4; NPP_PRVGran750 500.1
OPS code: NPP_PRwcalc 1.3.4; NPP_PRVGran750 1.3.1
ST code: NPP_PRwcalc 1.1.4; NPP_PRVGran750 1.1.1
LP code: NPP_Pointer 2.9
Information Source:
Name: Assigned by Land PEATE Integration Team
X (SCI code): CasaNOSA revision number
X.X (OPS code): IDPS build number, as listed on CasaNOSA
X (Science Team (ST) code): PEATE build number
Y: Assigned by Land PEATE CM & Land PEATE Integration Team
Z: Assigned by Land PEATE Integration Team

Where Stored: Hard-coded in PGE Perl script and written in PCF

3.3.6VIIRS Data Versioning

All data products that are produced at the Land PEATE facility will be identified and tracked by fields in the NPPDAPS databases and as metadata in the data files themselves. Other files ingested to NPPDAPS will be identified and tracked in the NPPDAPS databases. File names for files produced by IDPS will be tracked in the NPPDAPS database. Both the IDPS name for the file when it was ingested and the file as re-named by NPPDAPS will be stored in the database. Files generated by IDPS will not be altered to contain PEATE-generated metadata. This preserves the integrity of the IDPS file contents. Additional data versioning information will be included in the output data files made at NPPDAPS.

3.3.6.1 Product Version

The data products that are made at the Land PEATE facility are assigned a version to identify and track the source of the data file, the PEATE Build under which the data were produced, and the science test in which the data were produced.

Database FieldName: ProductVersion
Definition: Identifies location where file was generated (PEATE, IDPS, NGST, proxy data process, or Other), PEATE build number, and a unique test identifier.
Format: LM_N

L: File source/ location where file was generated:

"C" for SCI code outputs generated by Land PEATE, full and coarse resolution
"T" for ST code outputs generated by Land PEATE, full and coarse resolution
"P" for OPS code outputs generated by Land PEATE, full and coarse resolution
"I" if IDPS generated file (IDPS ingested files are renamed with the embedded ProductVersion, but no metadata or file names are written into the renamed IDPS files),
"N" if NGST generated proxy data of any type,
"S" if SDRGEN process generated file,
"J" for joint or combined Land, Ocean, and/or Atmosphere PEATE proxy data,
"O" if other (NICSE generated file, Atmosphere PEATE generated file, etc.)

"L" for Land PEATE products (DDR, CMG, or coarse) generated off-line and stored at NPPDAPS.

M: PEATE or proxy data build number (value: 1 …), IDPS or Other build number (value: 0)

N: Test number: Unique number for each algorithm change or input change used in an algorithm test. This is identical to the Archive Set Number. NPPDAPS and Land PEATE will use a 5-digit number for the Archive Set. Numbers 0 to 99 are reserved for special data products, such as data transferred to the PEATE from outside source or generated proxy data. Numbers 900 to 999 are reserved for archive sets needed for algorithm integration and system development activities.

Example: P1_00200
Information Source: Land PEATE Team/ Land PEATE Test Manager
Where Stored: L: written by the process
M: hard-coded in PGE Perl script and written into PCF
N: for each run of a science test, operators set an Archive Set number that is stored in the NPPDAPS database and read by the loader module. The loader module passes the Archive Set number to the PGE Perl script as a runtime parameter for writing into the metadata.

3.3.6.2 Local Granule ID

The file name for products made at NPPDAPS will be stored as metadata in the data file as well as tracked in the NPPDAPS database. In accord with the MODIS data production, the metadata field name to store the file name is Local Granule ID.

Database FieldName: LocalGranuleID
Definition: Product file identifier, also used as filename
Format: ShortName.DataDate.Time.ProductVersion.
ProductionDate.FileExtension
Example:
NPP_VMAE_L1.A2003025.1200.P1_00200.2005355160215.hdf
Information Source: Land PEATE
Where Stored: Constructed by the process

3.3.6.3 Proxy Data Type

Proxy data software will write the type and version of the proxy data into its output SDR, IP, or DDR CMG files.

Database FieldName: ProxyDataType
Definition: Type and version of proxy data set used to make SDR, IP, or DDR file; this field will only appear in proxy data files.
Format: Text
Example: NGST VIIRS Proxy Data Set 1.3 modified for full VIIRS swath width
Information Source: Land PEATE Team
Where Stored: Written into SDR, IP, or DDR by proxy generation code

3.3.6.4 Input Pointer

Data files input to PGEs to make the data products will be tracked as metadata in the output files. The format for listing the multiple input files for VIIRS products will follow the MODIS convention.

Database FieldName: InputPointer
Definition: List of input files used to make this product. If the PGE creates intermediate products that are deleted, those filenames are written to this field as well.
Format: Text, string of filenames with comma and space as a separator
Example:
NPP_VMAE_L1.A2003025.1200.P1_00200.2005355160215.hdf,
NPP_CMIP_L2.A2003025.1200.P1_00200.2005355160305.hdf
Information Source: Input files
Where Stored: Copied from filenames of input files

3.3.6.5 Land PEATE Tile ID

The Land PEATE Tile ID is defined and used for the aggregated MODIS-size tile of 10 degrees by 10 degrees. IDPS is expected to send the Land tiled products in smaller size tiles of one-eighth the size of a MODIS tile. The IDPS tiles are assigned a sequential tile number which will be in the metadata associated with each file. Land PEATE will aggregate eight of these smaller size tiles into the corresponding MODIS-size tile. The IDPS tile numbers that comprise the aggregated tile will be stored into the TileID array for the aggregated tile. The Aggregated TileID will be assembled and written by the PGE from information in the

IDPS tiled product files and NPPDAPS database tables that contain the tile matching information from the Land PEATE.

Database FieldName: AggregateTileID

Definition for the 8-digit Integer: AggregateTileID is set to an 8-digit integer with two 1-digit fields followed by two 3-digit fields.

Format: D1.D2.D3.D4, digits where:

D1: The first digit (the leftmost digit) is used to identify the projection, i.e., the gridding/tiling scheme. The possible values for the first digit are 1, 2, 3, 4 and 5. The value 1 is used for the Integerized Sinusoidal projection, 2 for the Goode's Homolosine projection, 3 for the Lambert Azimuthal Equal-Area projection, 4 for the Hammer Aitoff projection, and 5 for the Sinusoidal projection. Initially, only the Sinusoidal (5) and Lambert Azimuthal Equal-Area projection (3) are expected to be used in the LPEATE.

D2: The second digit is used to specify the tile size, and it has 4 possible values: 1, 2 and 4. The value 1 is full size tile (approx. 10° square at the equator); 2 is for quarter size tile (approx. 5° square at the equator); 3 is for one-eighth size tile (approx. 2.5° N/S by 5° E/W at the equator); and 4 is for one-sixteenth size tile (approx. 2.5° square at the equator). Note that the only values expected to be used in production are: 1 – for Full size products produced in the LPEATE and aggregated products from the IDPS, and 3 – for one-eighth size unaggregated products received from the IDPS.

D3: The next 3 digits (digits 3 – 5) are used to specify horizontal tile number.

D4: The last 3 digits (digits 6 – 8) are for the vertical tile number.

The ranges of horizontal and vertical tile number that depend on the projection and tile size are listed in the table below.

Projection	Size	Horizontal Tile Range	Vertical Tile Range
1, 2, 4 & 5	1	0 to 35	0 to 17
1, 2, 4 & 5	2	0 to 71	0 to 35
1, 2, 4 & 5	3	0 to 71	0 to 71
1, 2, 4 &	4	0 to 143	0 to 71

5			
3	1	0 to 18	0 to 18 (northern hemisphere)
			20 to 38 (southern hemisphere)
3	2	0 to 37	0 to 37 (northern hemisphere)
			40 to 77 (southern hemisphere)
3	3	0 to 37	0 to 75 (northern hemisphere)
			80 to 155 (southern hemisphere)
3	4	0 to 75	0 to 75 (northern hemisphere)
			80 to 155 (southern hemisphere)

Example: A tile ID of 51018009 identifies the full size tile in the Sinusoidal projection with horizontal tile number 18 and vertical tile number 9.

Information Source: Land PEATE Team

Where Stored: NPPDAPS database tables

3.3.7VIIRS File Header Global Metadata

All VIIRS product HDF files made by the Land PEATE at NPPDAPS will have headers containing standard global metadata. The headers contain the attributes relating to the SDS contents, the global file attributes written by HDFEOS, and the global file attributes determined and written by the VIIRS PGEs according to the Land PEATE conventions. The first two types will not be discussed in this document. The third type contains the algorithm, software, and data versioning attributes described in Sections 3.3.5 and 3.3.6 and the following fields describing the product ESDT, the file name, and the temporal and spatial attributes that uniquely identify this data file within the ESDT collection.

3.3.7.1 L1 and L2 Swath Data Products

The L1 and L2 swath products exported from IDPS/CLASS or SD3E and ingested by NPPDAPS will contain metadata for the scans of data packaged into granules produced by the IDPS in operations. IDPS has not yet decided how many VIIRS scans of data will be included in each granule. Some of the packages under consideration are 16 scans covering a time period of about 28.5 seconds and 48 scans

covering a time period of about 85.5 seconds. Either IDPS/CLASS or NPPDAPS may perform the aggregation to 5-minute granules for some data product users, but Land PEATE will input the un-aggregated granules and perform the aggregation at NPPDAPS. Some of the IDPS-size granule metadata values will be retained by the Land PEATE L1 and L2 5-minute aggregated granules. The 5-minute granules will also contain the aggregate metadata that are set by the Land PEATE's PGEs running at NPPDAPS. The global metadata for L1 and L2 granules are listed below for the 5-minute aggregate and the IDPS-size granules that are included in the aggregate. A maximum of 11 individual 28.5-seconds IDPS granules or 5 individual 85.5-seconds IDPS granules will be included in the aggregated granule. Only attributes that are applicable to the data product will be included.

Database Field Name **Description**

- ShortName ESDT ShortName for the Data Collection
- LongName ESDT LongName for the Data Collection
- AggregateBeginningDate Start Data Acquisition or Observation Date
- AggregateEndingDate End Data Acquisition or Observation Date
- AggregateBeginningTime Start Data Acquisition or Observation Time
- AggregateEndingTime End Data Acquisition or Observation Time
- PGE_StartTime Start Date and Time of Data Granule on the 5-minute Boundary
- PGE_EndTime End Date and Time of Data Granule on the 5-minute Boundary
- ProductionDateTime Date and Time that Data Were Produced
- AggregateStartOrbitNumber Orbit Number for Start of Data in Granule
- AggregateStopOrbitNumber Orbit Number for Stop of Data in Granule
- AggregateEquatorCrossingLongitude Longitude at which Satellite Crosses the Equator
- AggregateEquatorCrossingDate

Date when Satellite Crosses the Equator

- AggregateEquatorCrossingTime
  Time when Satellite Crosses the Equator
- Aggregate_North_Bounding_Coordinate
  North Bounding Coordinate in Degrees Latitude of Aggregated Data Granule
- Aggregate_East_Bounding_Coordinate
  East Bounding Coordinate in Degrees Longitude of Aggregated Data Granule
- Aggregate_South_Bounding_Coordinate
  South Bounding Coordinate in Degrees Latitude of Aggregated Data Granule
- Aggregate_West_Bounding_Coordinate
  West Bounding Coordinate in Degrees Longitude of Aggregated Data Granule
- AggregateG-RingLatitude (1 – 4)
  Array of Four Points of Latitudes in Degrees Connected by Great Circle Arcs for Aggregated Data Granule
- AggregateG-RingLongitude (1 – 4)
  Array of Four Points of Longitudes in Degrees Connected by Great Circle Arcs for Aggregated Data Granule
- AggregateDayNightFlag Flag Indicating Whether Data in Granule is
  Daytime, Nighttime, Mixture of Both or NA (Unusable Data). (Valids: Day, Night, Both, NA).
- Beginning_Date (1 - NGI) Start Data Acquisition or Observation Dates
  Of First to Last IDPS-size Granules in Aggregate. NGI = Number of Granules from IDPS Input to Aggregate.
- Ending_Date (1 - NGI) End Data Acquisition or Observation Dates of
  First to Last IDPS-size Granules in Aggregate. NGI = Number of Granules from IDPS Input to Aggregate.
- Beginning_Time (1 - NGI) Start Data Acquisition or Observation Times
  Of First to Last IDPS-size Granules in

Aggregate. NGI = Number of Granules from IDPS Input to Aggregate.

- Ending_Time (1 - NGI) End Data Acquisition or Observation Times of First to Last IDPS-size Granules in Aggregate. NGI = Number of Granules from IDPS Input to Aggregate.
- NumberGranulesIncluded Number of IDPS-size Granules in 5-minute Aggregate Granule
- DayNightFlag.(1 - NGI) Flag Indicating Whether Data in Granule is Daytime, Nighttime, Mixture of Both, or NA (Unusable Data). (Valids: Day, Night, Both, NA). NGI = Number of Granules from IDPS Input to Aggregate.
- AlgorithmType Source of Algorithm Code (Valids: "SCI", "OPS", "ST", "LP")
- PEATEAlgorithmVersion Version of the Algorithm or Process that Generates One or More Products
- PGEVersion Version of the PGE Containing the Algorithm Code that Generates the Product at NPPDAPS
- ProductVersion Identifier for Location where File was Generated, PEATE Build Number, and Algorithm Test Number
- LocalGranuleID Product File Name Identifier at NPPDAPS
- ProxyDataType Text String Indicating Type of Proxy Data (Included only for proxy data)
- InputPointer (1-NIF) List of Input Files (LocalGranuleID) Used to Make this Product. NIF = Number Input Files
- ProcessingEnvironment Computer System Environment for PGE Run
- PlatformShortName Satellite on which Instrument is Flying
- InstrumentShortName Instrument that is Observing Data

3.3.7.2 L2G, L3, and L4 Gridded, Tiled Data Products

The L3 and L4 gridded products exported from IDPS/CLASS or SD3E and ingested by NPPDAPS will contain metadata for the 5

by 2.5 degree VIIRS-size tiles produced by the IDPS in operations. Either IDPS/CLASS or NPPDAPS will perform the aggregation to 10 by 10 degree MODIS-size granules, including the determination and writing of the metadata attributes pertaining to the aggregated MODIS-size tiles. Some of the VIIRS-size tile metadata values must also be retained by the Land PEATE L3 and L4 MODIS-size aggregated tiles that are made by the Land PEATE's PGEs running at NPPDAPS. A maximum of 8 individual VIIRS-size tiles will be included. L2G, L3, and L4 gridded DDR products produced off-line by Land PEATE will be generated in MODIS-size tiles and will contain both the aggregation product metadata and component VIIRS-size tile metadata. DDRs made from MODIS data to be used either for testing or comparison will contain only the aggregate metadata. The list of global metadata for L2G, L3, and L4 gridded, tiled VIIRS data below includes the aggregated MODIS-size tile attributes and the component VIIRS-size tile attributes.

Database Field Name **Description**

- ShortName ESDT ShortName for the Data Collection
- LongName ESDT LongName for the Data Collection
- AggregateBeginningDate Start Data Acquisition or Observation Date
- AggregateEndingDate End Data Acquisition or Observation Date
- AggregateBeginningTime Start Data Acquisition or Observation Time
- AggregateEndingTime End Data Acquisition or Observation Time
- PGE_StartTime Start Date and Time of Data Granule on the Processing Period Boundary
- PGE_EndTime End Date and Time of Data Granule on the Processing Period Boundary
- ProductionDateTime Date and Time that Data Were Produced
- AggregateStartOrbitNumber Orbit Number for Start of Data in Granule
- AggregateStopOrbitNumber Orbit Number for Stop of Data in Granule
- AggregateEquatorCrossingLongitude Longitude at which Satellite Crosses the Equator

- AggregateEquatorCrossingDate
  Date when Satellite Crosses the Equator
- AggregateEquatorCrossingTime
  Time when Satellite Crosses the Equator
- Aggregate_North_Bounding_Coordinate
  North Bounding Coordinate in Degrees Latitude of Aggregated Data Granule
- Aggregate_East_Bounding_Coordinate
  East Bounding Coordinate in Degrees Longitude of Aggregated Data Granule
- Aggregate_South_Bounding_Coordinate
  South Bounding Coordinate in Degrees Latitude of Aggregated Data Granule
- Aggregate_West_Bounding_Coordinate
  West Bounding Coordinate in Degrees Longitude of Aggregated Data Granule
- AggregateG-RingLatitude (1 – 4)
  Array of Four Points of Latitudes in Degrees Connected by Great Circle Arcs for Aggregated Data Granule
- AggregateG-RingLongitude (1 – 4)
  Array of Four Points of Longitudes in Degrees
  Connected by Great Circle Arcs for Aggregated Data Granule
- AggregateDayNightFlag Flag Indicating Whether Data in Aggregated
  Tile is Daytime, Nighttime, Mixture of Both or NA (Unusable Data). (Valids: Day, Night, Both, NA). First to Last of the 8 tiles in Aggregate
- AggregateTileID Tile Identification Number for Aggregate Tile
- AggregateHorizontalTileNumber
  Two-Digit Grid Cell Number (00-35) for Aggregate Tile in Horizontal Direction
- AggregateVerticalTileNumber
  Two-Digit Grid Cell Number (00-17) for Aggregate Tile in Vertical Direction
- Beginning_Date (1 - 8) Start Data Acquisition or Observation Dates
  of First to Last of the 8 Tiles in Aggregate

- Ending_Date (1 - 8) End Data Acquisition or Observation Dates of First to Last of the 8 Tiles in Aggregate
- Beginning_Time (1 - 8) Start Data Acquisition or Observation Times of First to Last of the 8 Tiles in Aggregate
- Ending_Time (1 - 8) End Data Acquisition or Observation Times of
- TileID (1 – 8) Tile Identification Numbers for Component Tiles in IDPS Notation
- HorizontalTileNumber (1 - 8) Two-Digit Grid Cell Numbers (00-71) for Component Tiles in Horizontal Direction
- VerticalTileNumber (1 – 8) Two-Digit Grid Cell Numbers (00-71) for Component Tiles in Vertical Direction
- DayNightFlag (1- 8) Flag Indicating Whether 5-Minute Granules in the 8 Tiles are Daytime, Nighttime, Mixture of Both or NA (Unusable Data). (Valids: Day, Night, Both, NA).
- NumberOfGranulesIncluded Number of 5-Minute Granules Included in the Aggregate Tile
- NumberOfTilesIncluded Number of 5 by 2.5 Degrees Tiles Included in the Aggregate Tile
- AlgorithmType Source of Algorithm Code (Valids: "SCI", "OPS", "ST", "LP")
- PEATEAlgorithmVersion Version of the Algorithm or Process that Generates One or More Products
- PGEVersion Version of the PGE Containing the Algorithm Code that Generates the Product at NPPDAPS
- ProductVersion Identifier for Location where File was Generated, PEATE Build Number, and Algorithm Test Number
- LocalGranuleID Product File Name Identifier at NPPDAPS
- ProxyDataType Text String Indicating Type of Proxy Data (Included only for proxy data)

- InputPointer (1-NIF) (LocalGranuleID) List of Input Files Used to Make this Product. NIF = Number Input Files
- ProcessingEnvironment Computer System Environment for PGE Run
- PlatformShortName Satellite on which Instrument is Flying
- InstrumentShortName Instrument that is Observing the Data

3.3.8NPPDAPS Recipes

NPPDAPS will run VIIRS PGEs that have been organized into Recipes containing PGEs that have the same types of input products, the same processing levels, and produce similar products. The Land PEATE will have several chains of PGEs based on similar products of interest to the various VIIRS Science Disciplines. These chains will consist of a series of Land products that are required as inputs to the next PGE in the chain. The chains will be discussed in more detail in Section 4.

3.4 Aggregation of VIIRS Data

The Land PEATE has requested that several types of VIIRS products generated by the IDPS Operational System be aggregated or packaged before being exported to NPPDAPS. Users of the VIIRS products have met with NESDIS/CLASS at workshops to help define areas where CLASS can perform some aggregation and packaging that will make products more useful to the science community before exporting IDPS products to their facilities. The recommendations of the Land PEATE are the following:

- Temporal aggregation of IDPS-size xDR swath granules containing 48 (sometimes 47) scans with temporal coverage of about 86 seconds (originally16 scans covering 28.5 seconds) into xDR swath granules containing about 144 scans with temporal coverage of 5 minutes.
- Band packaging of IDPS individual band files into two SDR files of Imagery Resolution (375m) Bands and Moderate Resolution (750m) Bands. The Day/Night Band will not be needed for land PEATE.
- Geolocation packaging of terrain-corrected VIIRS geolocation into the two SDR files and also separate geolocation files by band resolution.

However, there are other considerations which must be taken into account when actually making the aggregated data products. Some of these are missing time periods, missing bands, methods of replacing missing data that arrive late, preferences of Science Team members for obtaining single bands only, and regeneration of corrupted files.

This version of the document assumes that the Land PEATE will order un-aggregated data from IDPS via CLASS and SD3E for most of these products. Recommended aggregations and packaging will be implemented by the Land PEATE itself. The Land PEATE will get the terrain-corrected geolocation in a file to use for its data processing. All data processing and product descriptions are written under these assumptions.

The Land PEATE will aggregate eight of the small VIIRS tiles of L3 gridded products generated by IDPS into one corresponding MODIS-size tile for its users. All L3 VIIRS Gridded data products will be produced by the VIIRS PGEs at NPPDAPS into the MODIS-size tiles. The Land PEATE will also produce Diagnostic Data Records (DDRs) in MODIS-size tiles, coarse granule products at 5km resolution from L2 algorithms, daily global browse products from the L2 coarse granules, and Climate Modeling Grid (CMG) products. Details of each type of aggregation and packaging are discussed below.

3.4.1VIIRS Temporal Aggregation

Currently IDPS plans to export granules of Level 1 and 2 VIIRS data in files containing 48 scans of data covering a time period of 85.5 seconds of data (originally 16 scans covering 28.5 seconds) to CLASS and other users. Larger size granules, such as the MODIS 5-minute granules, are easier to track and can be handled more efficiently in NPPDAPS because the number of granules is reduced by a factor of ten or more. The VIIRS PGEs currently are designed to process by 5-minutes data granules. The Land PEATE has requested that the L2 VIIRS granules be aggregated into 5-minute granules before being exported to NPPDAPS. Since data quality requirements for the aggregation are not likely to be met, Land PEATE will perform its own aggregation. The Land PEATE Integration Team has developed new software to do this aggregation just after the L2 data are ingested into NPPDAPS.

3.4.2VIIRS Band and Geolocation Packaging

IDPS plans to generate the Level 1 VIIRS SDRs separately for each Band and export the data for each Band in separate files to CLASS. IDPS will produce at least six different VIIRS geolocation products. These include ellipsoid and

terrain corrected products at each of the resolutions: Imagery Bands, Moderate Bands, and Day/Night Band. In addition to spatial coordinates, the viewing geometry is also produced: solar zenith angle, sensor zenith angle, solar azimuth angle, sensor azimuth angle, range, lunar zenith angle (D/N band), and lunar azimuth angle (D/N band).

The Land PEATE has requested the L1 VIIRS SDR data be exported to NPPDAPS in a packaged form by type of bands. The Moderate Resolution (750m) Bands, the Imagery Resolution (375m) Bands, and the Day/Night Band would be in separate files. This aggregation would allow only the type of data needed for each VIIRS L2 PGE to be staged as a single file for production.
The Land PEATE has also requested that the VIIRS terrain-corrected geolocation be packaged with the SDR data that is packaged by band resolution. In addition, the Land PEATE requested that the terrain corrected geolocation data be stored separately for each resolution so that users can order corresponding geolocation data with any EDR product. Since the Land PEATE is unaware of any users of ellipsoid geolocation, they recommended that it not be stored.

NESDIS/CLASS, in their instance of IDPS, can choose how the SDR bands and the geolocation data are packaged in the SDR, EDR, and other products. As a result of the NOAA CLASS Users' Workshop, CLASS may decide to package the SDR bands requested by many of the users, including the Land PEATE. Since no decision has been made, the Land PEATE has also developed software to package the Bands into the combinations that the Land PEATE has requested.

3.4.3Aggregation of VIIRS Tiles for Gridded Global Products

The VIIRS Land Gridded global products are produced by IDPS at a resolution of 1km in the Sinusoidal Projection. IDPS also plans to generate and export several Level 3 VIIRS Gridded IPs in the form of VIIRS tiles, which are much smaller than MODIS tiles. This makes ordering of data by the VIIRS Science Team to match MODIS data difficult. The data are divided into tiles, each with an associated tile number that is assigned sequentially throughout the Cartesian space over the Earth. However, the grid size and thus the numbering of the tiles will be different from MODIS tiles. The MODIS tiles have a horizontal number and a vertical number on the grid. To facilitate the matching of corresponding VIIRS and MODIS tiled data, the Land PEATE will assign horizontal and vertical cell numbers to the VIIRS tiles for each of the sequential numbers assigned by the Operations System. The original VIIRS sequential tile number from IDPS will be stored in the metadata by VIIRS PGEs. Table 3-3 contains the detailed information for

vertical and horizontal tile cells for MODIS and VIIRS tiled data.

Table 3-3 MODIS and VIIRS Tiles

Instrument	Ver. Tile Size Degrees	Hor. Tile Size Degrees	# Tiles Vertical Direction	# Tiles Horizontal Direction	Tile Range Vertical	Tile Range Horizontal
MODIS	10	10	18	36	0 - 17	0 - 35
VIIRS	2.5	5	72	72	0 - 71	0 - 71

The VIIRS tiles that are exported by IDPS and ingested by NPPDAPS will be stored as files with the assigned tile cells as shown in Table 3-3 and renamed with the horizontal and vertical tile numbers embedded in the file name as is done for MODIS data. A single embedded character "u" will indicate that the file contains un-aggregated tiles. At this point the VIIRS tiles are 5 degrees in the horizontal direction and 2.5 degrees in the vertical direction. Before using the VIIRS tiles in the running of the VIIRS PGEs, the VIIRS tiles will be aggregated into MODIS size tiles to produce tiles that exactly match the MODIS tiles. Eight un-aggregated VIIRS tiles will be included in one aggregated VIIRS tile. The aggregated file names will contain the MODIS grid horizontal and vertical cell numbers. The absence of the "u" in the file name indicates that the tiles are aggregated. It will be easier for users to order and compare the aggregated VIIRS tiles to MODIS tiles. The NPPDAPS databases include tables to match the small VIIRS tiles to the larger MODIS-size tiles. Users may obtain both the original VIIRS tiles ingested from IDPS and the aggregated MODIS-size tiles in NPPDAPS.
The total number of VIIRS-size tiles in the Sinusoidal projection is 5184. However, many of the VIIRS land gridded data products will contain only the tiles that have at least some land data. Tiles containing only ocean or other water cells will not be generated. There are also 1757 tiles in the numbering system that are not on the Earth's surface and will thus not be included. The Land-only gridded products will contain only 2457 VIIRS tiles. Each of these tiles contains 600 by 300 data points. The VIIRS gridded products that also contain ocean or water cells are Gridded Previous Ice Age IP, Gridded Snow/Ice Cover IP, Gridded Quarterly Surface Type IP, Gridded Quarterly Min/Max Vegetation Index IP, and Gridded Quarterly Surface Type. Table 3-4 contains the list of the VIIRS Gridded IPs to be generated by IDPS. These products will be stored at NPPDAPS when they are ingested.

Table 3-4 VIIRS Gridded Data Products Produced by IDPS

VIIRS Product Name	Update Cycle	Tiling	Size Single Instance	NPPDAPS Archive Storage
Gridded Daily Surface Reflectance L3 IP	Daily	Land Only	184.50 GB	1/day
Gridded Monthly Brightness Temperature, Surface Reflectance, & Vegetation Index L3 IP	Daily	Land Only	162.24 GB (63.31 + 71.24 + 27.69)*	1/month
Gridded Previous Ice Age L3 IP	On orbit basis	Global TBD	2.87 GB	1/day
Gridded Snow/Ice Cover L3 IP	On orbit basis	Global TBD	3.44 GB	1/day
Gridded 17-Day NBAR NDVI L3 IP	On orbit basis	Land Only	TBD	1/17 days
Gridded Land Surface Albedo L3 IP	1 per 17 days	Land Only	101.92 GB	1/17 days
Gridded BRDF Archetypal L3 IP	1 per 17 days	Land Only	27.1 GB	1/17 days
Gridded Quarterly Surface Type L3 IP	1 per 90 days	Global TBD	3.0 GB	1/90 days
Gridded Annual Min/Max Quarterly Vegetation Index L3 IP	1 per 90 days	Global TBD	0.46 GB	1/90 days

* Sum of file sizes for three previous monthly gridded products.

The VIIRS Gridded IPs will be updated at different cycles depending on the type of product. The two types of update cycle are continuous and at a fixed interval. The fixed intervals for VIIRS data are daily, 17 days and 90 days.

A continuous update cycle is defined as an update by the time of the next contact. The update cycle will thus be on an orbital basis at NPPDAPS. As L2 swath input data products to a particular gridded product are generated by L2 software in the production system, the relevant gridding software must be run for that new observation to update the tile or tiles before that location is seen again by the satellite.

IDPS will do the update every 5 minutes as each new swath is generated. Because of the large sizes of some of the gridded tiled products, the update will trigger an internal versioning of the updated tiles and the IDPS production system must expire the previous version of the tile as soon as the next version has been completed and the previous version is no longer being used by any process in the system.

There are several gridded IPs that will be updated on a daily basis. These products are listed in Table 3-4. At the end of the day the IDPS production system will close the daily file and store it only as long as it is needed in production. A new file will be started for the next day. When NPPDAPS either ingests or produces these daily files, they may be saved for longer periods as determined by the Land PEATE.

There are two VIIRS gridded data products that are updated at 17-day intervals. These are the Land Surface Albedo and the BRDF Archetypal products. The gridding software for these products is run once every 17 days using as input 17 days of consecutive Gridded Daily Surface Reflectance. The NBAR NDVI product is also a 17-day product that is archived and saved for a longer term every 17 days. However, a granulated swath from this gridded data set is needed as input for some L2 PGEs. It will be updated every orbit in NPPDAPS. There are also two VIIRS gridded data products that are updated at 90-day intervals. These are the Surface Type and Min/Max Vegetation Index. The input consists of 3 consecutive months of Gridded Monthly Surface Reflectance, Vegetation Index, and Brightness Temperature. These monthly products have been replaced every quarter of the year by the new set of three consecutive months of data. The new set of three monthly inputs is used to generate the new quarterly products. The four quarterly products of the year may be kept by users of the IDPS products as annual data sets, as they are in some of the MODIS data processing. The data set names for these quarterly products may thus contain "Annual" as part of their name along with the "Quarterly" data coverage or processing period field.

3.4.4VIIRS Land PEATE DDR Products

The MODIS Land Discipline uses a Sinusoidal Projection to grid MODIS data products into 10 degree by 10 degree tiles over the Earth at resolutions of 1km, 500m, and 250m. The resolution depends on the type of land product. The MODIS tile scheme has been discussed in the previous section. The MODIS land L2 swath data granules have been successfully aggregated into L3 gridded data using an intermediate process that first generates L2G data and then gridded L3

data. The MODIS L2G and L3 production are shown in Figure 3-2. Using the pre-defined tile scheme, the L2G Pointer PGE is run daily for every tile containing land data. The inputs to each instance of the Pointer PGE are the L2 swath geolocation data. The outputs are tiles containing the geolocation pointers and geolocation angles for the L2 swath granules for the day. Following the Pointer PGE, L2G Land PGEs are run for several types of land products using the pointers and geolocation angles as input and producing daily L2G tiles for these land products. Using the L2G land tiles as input, several types of L3 land gridded, tiled products are made daily and others are made every n-days.

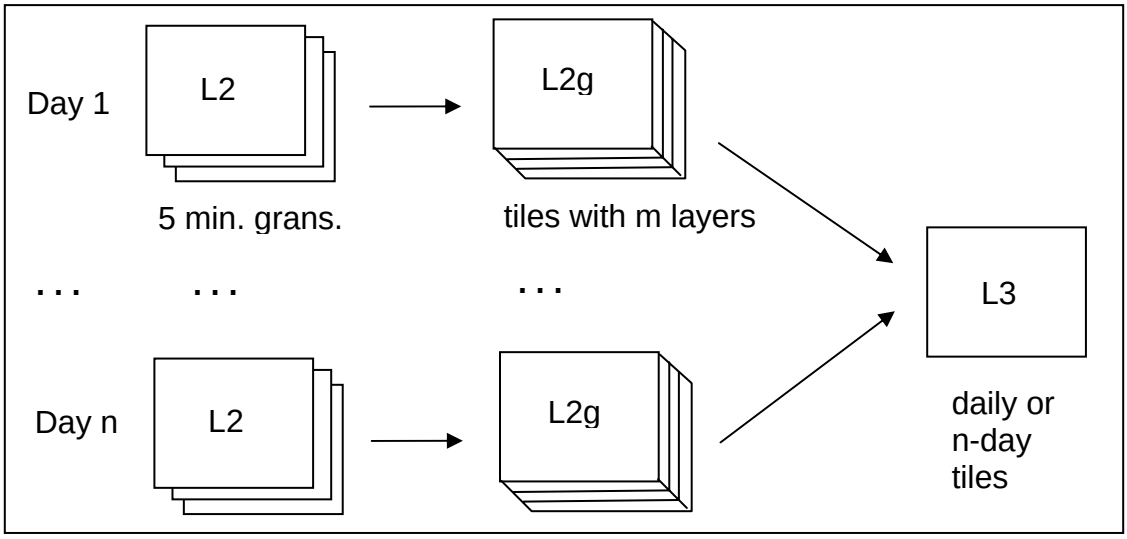


Figure 3-2 MODIS Level 3 Product Production

The Land PEATE plans to produce VIIRS Diagnostic Data Records (DDRs) to inter-compare to some of the MODIS L3 tiled daily and multi-day products. These DDRs will be made in addition to the L3 gridded IP products made by IDPS. The Land PEATE plans to use the same intermediate type process as is used for MODIS. Figure 3-3 shows the VIIRS L2G and L3 product production. Currently Figure 3-2 and 3-3 are the same.

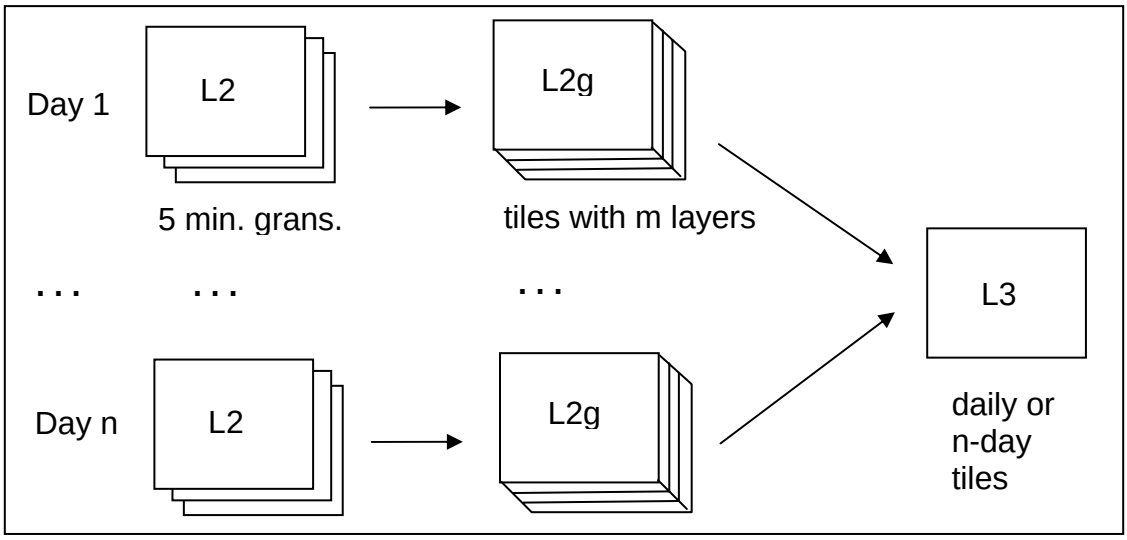


Figure 3-3 VIIRS DDR Production

Table 3-5 shows the current MODIS Collection 5 products that could be inter-compared to the VIIRS DDRs. In addition, MODIS Climate Modeling Grid (CMG) products (not shown) could also be inter-compared.

Table 3-5 MODIS L3 Products with Corresponding VIIRS DDRs

Product	Daily	8-day	16-day	Resolution
Surface Temperature	x	x		1km
Surface Reflectance		x		500m
Snow Cover	x	x		500m
Sea Ice	x			1km
BRDF/Albedo			x	500m
Vegetation Index			x	500m
Fire	x	x		1km
Land Cover Type			(1 year)	500m

Table 3-6 is a list of corresponding VIIRS DDR products that could be generated. The CMG products are not shown. Some of the IDPS Tiled Intermediate Products (IPs) are like the MODIS L2G products.

Table 3-6 VIIRS DDRs

Product	L2G-like IPs	Daily	8-day	16-day	Resolution
Surface Temperature	x	x	x		1km
Surface Reflectance	x		x		500m
Snow Cover	x	x	x		500m
Sea Ice	x	x			1km
BRDF/Albedo	x			x	500m
Vegetation Index	x			x	500m
Fire		x	x		1km
Surface Type				(quarterly)	1km

To generate VIIRS L2G DDR products:

MODIS L2G software will be modified to use VIIRS L2 products.

To generate VIIRS L3 DDR products:
MODIS L3 software will be modified to use VIIRS L2G-like IP products.

The Land PEATE will develop tools to map their 5 deg. x 2.5 deg. tiles into MODIS 10 deg. x 10 deg. tiles if we use IDPS gridded IPs as input.

3.4.5VIIRS Land PEATE Coarse Products and Coarse DDRs for NPP Land Data Product and Algorithm Evaluation

To facilitate web-based synoptic evaluation of Land xDRs produced at IDPS, Land PEATE plans to create global browses of the daily and n-day land SDRs and EDRs. The Land PEATE will create coarse resolution products of 5km resolution from the original full resolution products produced at the IDPS. The coarse product generation process will be run with all VIIRS L2 PGEs to produce the corresponding 5km coarse products. Coarse resolution SDRs and EDRs thus produced for a given data day can be re-projected into a global map using a map projection of choice, such as Hammer-Aitoff that is currently being used by the MODIS LDOPE for evaluation of MODIS land data products. The Land PEATE will also generate coarse resolution DDRs for other land DDRs used in the evaluation of NPP land science algorithms.

The following figure shows the complete process of creating a L2 global browse of VIIRS Land Surface Reflectance for a data day. Coarse resolution L2 surface reflectance granules

are created for each of the full resolution granules by running the coarse resolution PGE (PGE CRS) at the end of the L2 Land Surface Reflectance PGE (PGE 311). PGE CRS is a generic process that inputs a parameter file containing a list of the L2 parameter products for which corresponding L2 coarse products are to be generated. Users may order the coarse products. The L2 coarse granules are then used by a re-projection tool to create a global browse of L2 surface reflectance for the day.

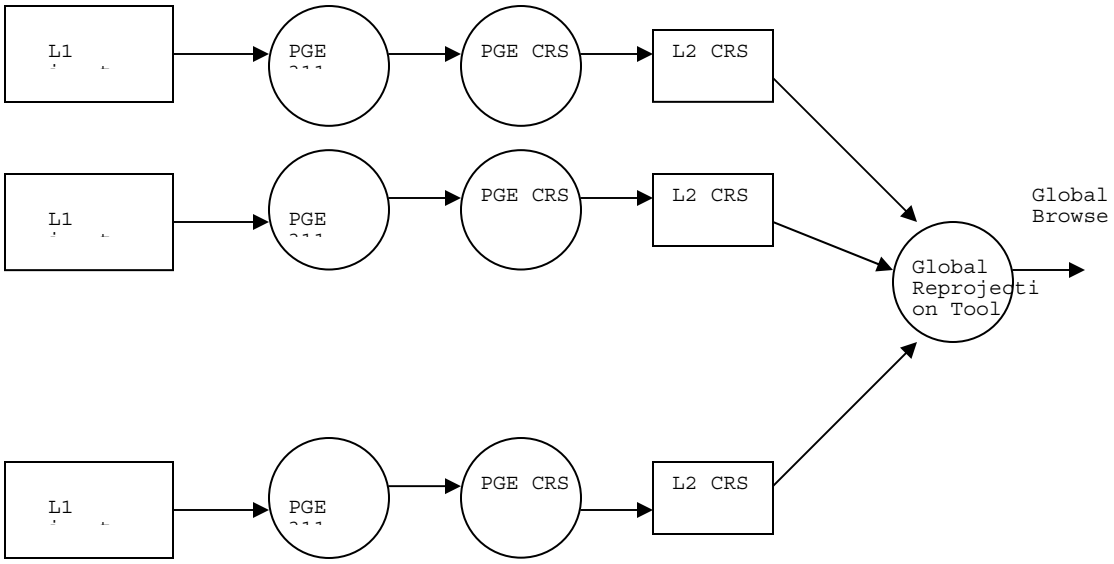


Figure 3-4 Process for Creating Daily Global Surface Reflectance Browse Products

Coarse resolution algorithms developed at the Land PEATE will employ one of the following three different schemes of aggregation for creating the coarse resolution xDRs from the original full resolution xDRs.

Coarse by subsampling: In this method one sample within the 5km x 5km window of the original resolution input is used in the output coarse product. Every SDS within an xDR will use the same sample in the output.

Coarse by averaging: A simple average of all observations within the 5km x 5km window of the original resolution input is used in the output coarse product. QA SDSs cannot be re-sampled by averaging; instead a more careful aggregation scheme would be required while aggregating samples of different quality.

Coarse by counting: Coarse resolution xDRs of some of the products, such as snow and fire, are created by counting the number of observations within the 5km x 5km window that are identified as snow or fire. A threshold on the number of these pixels is used to flag the output as fire or snow.

Geolocation is a required data set in all the output coarse products. Coarse geolocation is created by subsampling the geolocation in the input xDR when available, else it is processed from another xDR containing the geolocation data set.
The coarse products are named by appending 'C' to the short names (ESDT) of the input original resolution products. The following table shows ESDTs for some of the coarse products The Land PEATE will add more coarse products as science algorithms are integrated for NPPDAPS.

ESDT of the input full resolution product	ESDT of the output coarse product
NPP VMAE L1	NPP VMAE L1C
NPP SRFLIP L2	NPP SRFLIP L2C
NPP VRVI L2	NPP VRVI L2C
NPP_CMIP_L2	NPP_CMIP_L2C

3.4.6VIIRS Land PEATE Climate Modeling Grid DDRs

Climate Modeling Grid (CMG) products are single global products of 0.05 (5km) degree resolution obtained by spatially compositing all the input observations at every pixel. Daily CMG products are created by compositing all the xDRs for the day and the n-day CMGs are created by compositing all the n-day xDRs in the n-day period. Nominally each of the input granules is re-projected into the geographic projection and the observations at each grid cell are composited by either simple averaging of the best quality observations, as in the case of surface reflectance and vegetation index, or by selection of observations based on identification of feature, such as fire or snow detected with certain degree of confidence, as in the case of snow and fire CMG products.

There will be a separate PGE to generate each CMG product. The following figure shows the processing chain for creating a daily CMG of VIIRS Land Surface Reflectance. Daily L2 granules at 750m are re-projected and composited to create a global CMG of Land Surface Reflectance for the day.

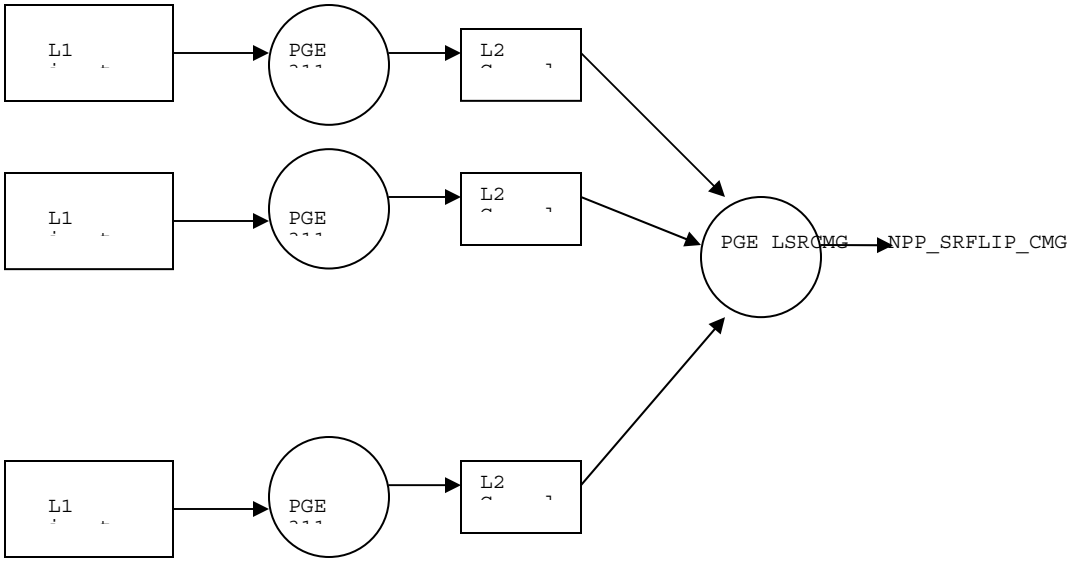


Figure 3-5 Process for Creating Surface Reflectance CMG Products

The CMG products are named by appending 'CMG' to the ESDT short names (omitting the processing level which is TBD) of the input products. Following table shows ESDTs for some of the CMG products. The Land PEATE will be adding more CMG products.

ESDT of the input full resolution product	ESDT of the output coarse product
NPP SRFLIP L2	NPP SRFLIP CMG
NPP VRVI L2	NPP VRVI CMG

3.5 Gridding and Granulation of VIIRS Data

One of the most important types of products for the science data processing is the gridded, global data set. Because the Earth's environment is constantly changing, the VIIRS global data sets must be updated frequently just as many external ancillary data sets are updated at set time intervals every day by external data providers. Some of the VIIRS algorithms require swaths from VIIRS and ancillary global, gridded data sets to match the geographical area being processed by the algorithm. For the NPP Project "Gridding" is defined as the process of compositing new data into the grid of existing global data using criteria relevant to the data product. "Granulation" is defined as the process of extracting a swath of data from the global grid of existing data to match a specific geometric area defined by the

coordinates of a L1 SDR swath. The swath of data from the global grid is required by one or more downstream VIIRS algorithms. Some of the early NPP documents used the term "regridding" for the granulation process. The software provided by the NPP Project for these purposes is the VIIRS Gridding/Granulation software.

3.5.1 NPP VIIRS Gridding/Granulation Software

The NPP Operational Gridding/Granulation software is available to the PEATEs during the pre-launch development period. This multi-purpose software can be used at many places in the VIIRS data processing chains of PGEs. The first use implements the Gridding part of the software to update the global data set by compositing new L2 swath granules. The second use implements the Granulation part to select and extract a swath of data at a VIIRS resolution from many types of VIIRS data to match the VIIRS SDR input swath currently being processed in the system. The third use implements the Granulation part to select and extract a swath of data at a VIIRS resolution from many types of ancillary data to match the VIIRS SDR input swath currently being processed in the system.

The VIIRS Gridding/Granulation software can be run separately to accomplish the various functions described above or it may also be chained in a single execution to accomplish several functions. The three figures below show the three different uses of the Gridding/Granulation software.

The VIIRS gridding and compositing is shown in Figure 3-6. The types of inputs for this function are the previous VIIRS gridded, global IPs to which the new data are to be composited and the swaths of VIIRS EDR and/or VIIRS IP. An additional SDR would be required only in cases in which the additional swath coordinate information was needed. The VIIRS Gridding software evaluates the new swath of data, determines how the compositing is to be done for the product, adds the new swath data to the previous VIIRS gridded global IP, and outputs the updated VIIRS gridded global IP. A variation of this gridding and compositing will also be used by the Land PEATE to composite several VIIRS gridded, global data sets of the same type into a single file covering a longer temporal period. An example is compositing 17 consecutive daily gridded, global VIIRS Surface Reflectance files into an existing 17-day gridded, global VIIRS Land Albedo file to make an updated version of the Land Albedo file. In this case the input swath IPs are replaced by input gridded, global IPs.

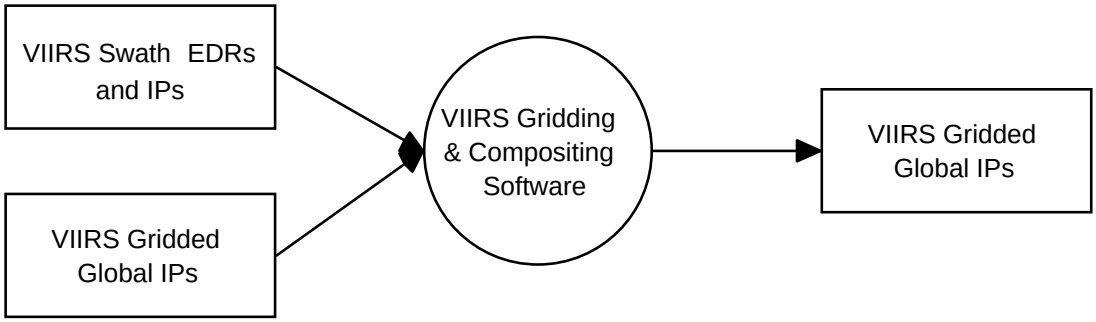


Figure 3-6 Gridding and Compositing of VIIRS Data

The granulation for VIIRS data is shown in Figure 3-7. The types of inputs for this function are the current VIIRS gridded global IP and the VIIRS swath SDR that contains the geolocation coordinates for the matching swath of data to be extracted from the VIIRS gridded global IP. The VIIRS Granulation software determines the swath coordinates, extracts the matching swath from the VIIRS gridded global IP, and outputs the VIIRS swath IP.

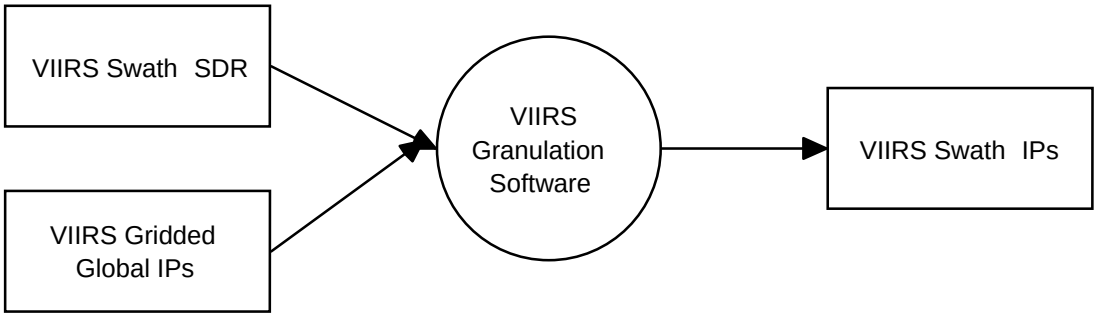


Figure 3-7 Granulation of VIIRS Data

The granulation for external ancillary data is shown in Figure 3-8. The types of inputs for this function are the current external ancillary global data file and the VIIRS swath SDR that contains the geolocation coordinates for the matching swath of data to be extracted from the external ancillary file. The VIIRS Granulation software determines the swath coordinates, extracts the matching swath from the external ancillary data file, and outputs the external ancillary swath data file.

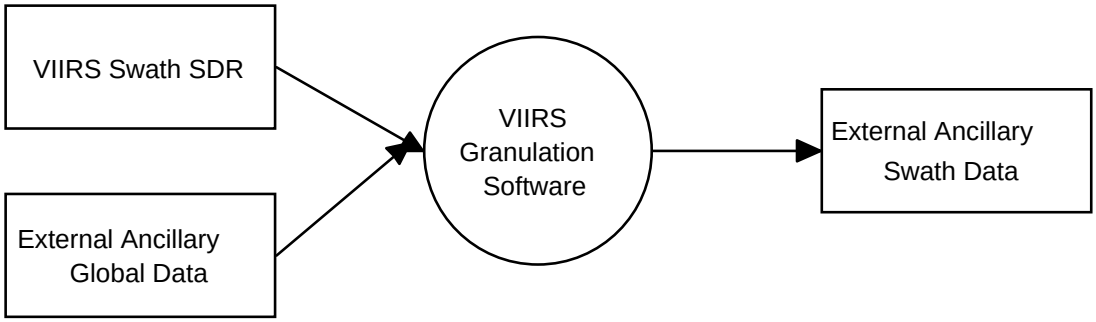


Figure 3-8 Granulation of External Ancillary Data

3.5.2Using Gridding/Granulation software in the Land PEATE

The Land PEATE plans to produce several VIIRS gridded global products, some corresponding to MODIS products, in the process of evaluation of VIIRS algorithms and products. The Land PEATE also plans to import several external ancillary gridded global data products, as is done for MODIS.

Swaths from these VIIRS gridded global products will be input to several VIIRS PGEs, including Level 2 PGEs that produce swaths of VIIRS data products. Many of the gridded, global data sets may be initialized with MODIS data converted to VIIRS resolutions and mapped to VIIRS grids. The VIIRS Granulation software will be run first in the processing chain to extract the swaths from the gridded products that match the VIIRS swaths. After new VIIRS swaths are produced, they will be fed back into the Gridding software and composited into corresponding VIIRS gridded global products to make an updated version. The Gridding software is primarily intended for post-processing.

The VIIRS Gridding/Granulation software may be run at several places in the VIIRS PGE chains. The configuration file inputs will determine which algorithms and functions are used in the compositing process or the granulation process and which output products are generated. The compositing algorithms include data selection by quality, weighting, averaging, interpolation, and mapping. The VIIRS Gridding and Granulation PGEs will be identified by various names within the VIIRS processing chains according to the VIIRS products that are being generated.

3.6 Configuration Management of VIIRS Software and Documents

The Configuration Management (CM) of the VIIRS software and documents will be performed under the Subversion (SVN) freeware by procedures analogous to CM of the MODIS software under ClearCase. The CM repository was designed with three main branches for the code and associated files. At the same directory level there are branches for the Land PEATE's documents and configuration files. These five main SVN branches under the NPP directory are the following:

- SCIENCE – Contains CasaNOSA NGST Science Code and several versions of some of this Science Code that have been modified with improved science algorithms by the VIIRS Land Science Team and made into PGEs to run in NPPDAPS. The Prototype System contained these PGEs. Since many algorithms are now available in OPS Code, future versions for each algorithm are expected to be made on the OPS Code.
- OPS - Contains the IDPS Operational Code and several versions that have been modified with improved science algorithms by the VIIRS Land Science Team and made into PGEs to run in NPPDAPS; the code is either from CasaNOSA or SD3E. The OPS directory has the branches subdirectory to hold these versions.
- ST - ScienceTeam – Contains VIIRS science code submitted by the Land Science Team (LST) members that has been modified to run in NPPDAPS. In the future the LST is expected to work from current versions of the OPS Code and submit modified versions to be stored in the branches of the OPS directory.
- docs – Contains the Land PEATE documents and other documents for which the VIIRS Land Science Team would like to keep a local copy for quick reference.
- Config – Contains configuration files that control how the computer environment is set-up and how the code is run to produce various products.

As in MODIS CM, the science algorithms packaged into PGEs will be separated within each main branch. Code is checked out of the CasaNOSA SVN for use by the Land PEATE Integration Team in a separate area where it is modified for running in NPPDAPS. Modified code is then checked into the appropriate branch described above. Versions of each PGE will be tracked as updates to the code are received and changes are made for running the code under NPPDAPS. All versions will be retrievable under SVN and can be rebuilt for use in testing and operations. Files associated with each PGE will be kept in the PGE sub-directories along with the code. Within each of the three code branches, the files are organized into different sub-directories. The OPS Code has the following structure:

- Include
  - Shared (e.g., viirs.h, hdf_helper.h)
  - LandModule
  - Others (e.g., Gridding include)
- Library
  - Shared (e.g.,Common parameter code, help code to read/write hdf)
  - LandModule (e.g., Config_LandModule.c, LQF_Handler.c)
  - Others (e.g., Gridding library)
- PGExxx
  - COMB
    . Perl Scripts that control the process in NPPDAPS
    . History files that list history of PGE and its processes
    . Install List for all files necessary for installation, including LUTs, config, etc.
    . ciList that shows version, processes, and shared directories
    . README files that explain how to build the module and
    production rules for running the PGE in NPPDAPS
  - Process A
    . History of this process
    . Code files
    . Include files specific to the process
    . makefile specific to the process
  - Process (B,C, …)
  - cfg containing miscellaneous configuration files (e.g., vcm.cfg)

  …
- PGEyyy
- branches (variations of OPS code only)
- shared_source
- src_orig
- tags

The code, test data, and documentation will be accessible to all approved users under SVN and from a Land PEATE web site. The original source CasaNOSA science and operational code is preserved in CasaNOSA SVN where it can be examined and checked out at any time. A snapshot of the index of the OPS sub-directory is shown below.

File	Rev.	Age	Author	Last log entry
OPS/				
– Include/	537	11 days	integrator1	undid swath additions
– Library/	488	3 weeks	integrator2	Adding pack library code

- PGE303/ 541 7 days modiscm Adding CM build scripts
- PGE304/ 541 7 days modiscm Adding CM build scripts
- PGE307/ 508 2 weeks integrator1 moved to Include/PRO
- PGE311/ 541 7 days modiscm Adding CM build scripts
- PGE316/ 546 15 hours integrator3 initial commit
- PGE330/ 547 4-days integrator3 initial commit
- PGE356/ 541 7 days modiscm Adding CM build scripts
- branches/ 556 15 hours modiscm Modifying ciList again
- shared_source/544 4 days integrator3 input scan lines problem
- src_orig/ 444 4 weeks modiscm Adding NPP OPS version
- tag/ 540 7 days modiscm Tag CM_PGE356_VP1.0.0

When the Land PEATE Integration Team has integrated algorithms into PGEs and developed the loaders and recipes to run under the NPPDAPS Operational System, these PGEs with associated scripts and auxiliary files are delivered to the Configuration Manager to be used in Land PEATE Science Tests. The Configuration Manager builds the executable code from the CM directories. The source code remains in the SVN directories. The Configuration Manager then installs the PGE executables, PGE scripts, loaders, recipes, and other auxiliary files needed at runtime into NPPDAPS where they are stored for the Land PEATE Science Test runs.

The Land PEATE is required to document software that is developed in the course of the mission. The Land PEATE may also request that copies of documents, white-papers, and information provided by other NPP groups be stored for their use. The docs branch holds this Land PEATE documentation. Currently the docs branch contains the base-lined Version 1.1 of the Land PEATE VIIRS Science Data Processing Software System Description document and an edit version of the NPP System Design document.

3.7 Integration and Test of VIIRS Science Algorithms for NPPDAPS

The Land PEATE Integration Team is integrating the IDPS Operations Code and the corresponding NGST Science Code. Both of these types of code contain the science algorithms for generating the VIIRS data products. IDPS adapted the NGST Science Code to execute in its data production system.

During the early development of the NPP processing system the Land PEATE Integration Team and CM obtained NGST Science Code and test data directly from CasaNOSA. At some point new versions of NGST Science Code will no longer be available.

The VIIRS Science Team has been making improvements to the science algorithms and updating the NGST Science Code. The Land PEATE obtained some of the updated code and integrated it into NPPDAPS. This code was labeled with a PEATEAlgorithmVersion and will be called Science Team Code. The discussion on integration procedures for Science Code below refers to both types of Science Code. When the IDPS Operations Code became available, the Land PEATE obtained it from CasaNOSA and began the integration into NPPDAPS. The VIIRS Science Team will now make improvements to the Operations Code. Land PEATE will obtain the improved versions from the VIIRS Science Team and integrate them into NPPDAPS. The Integration and Test (I&T) of the VIIRS science algorithms will be done for the Land PEATE at the NPPDAPS Facility using similar methods and tools that are used for the MODIS I&T.

3.7.1Land PEATE Integration of Science Code

The NGST Science (SCI) Code obtained from CasaNOSA is designed to run in a file-oriented system. A limited amount of this SCI Code was enhanced by the Science Team with better algorithms and made available to the Land PEATE Integration Team for integration and testing early in the project. This science code is labeled as Science Team (ST) Code. It also runs in a file-oriented system and it needs the same type of PGE scripts as MODIS code to pass information to PGEs and execute processes within PGEs. Both the original NGST SCI Code and the modified ST Code are stored in the same SCIENCE branch of Subversion by CM as described in Section 3.6.

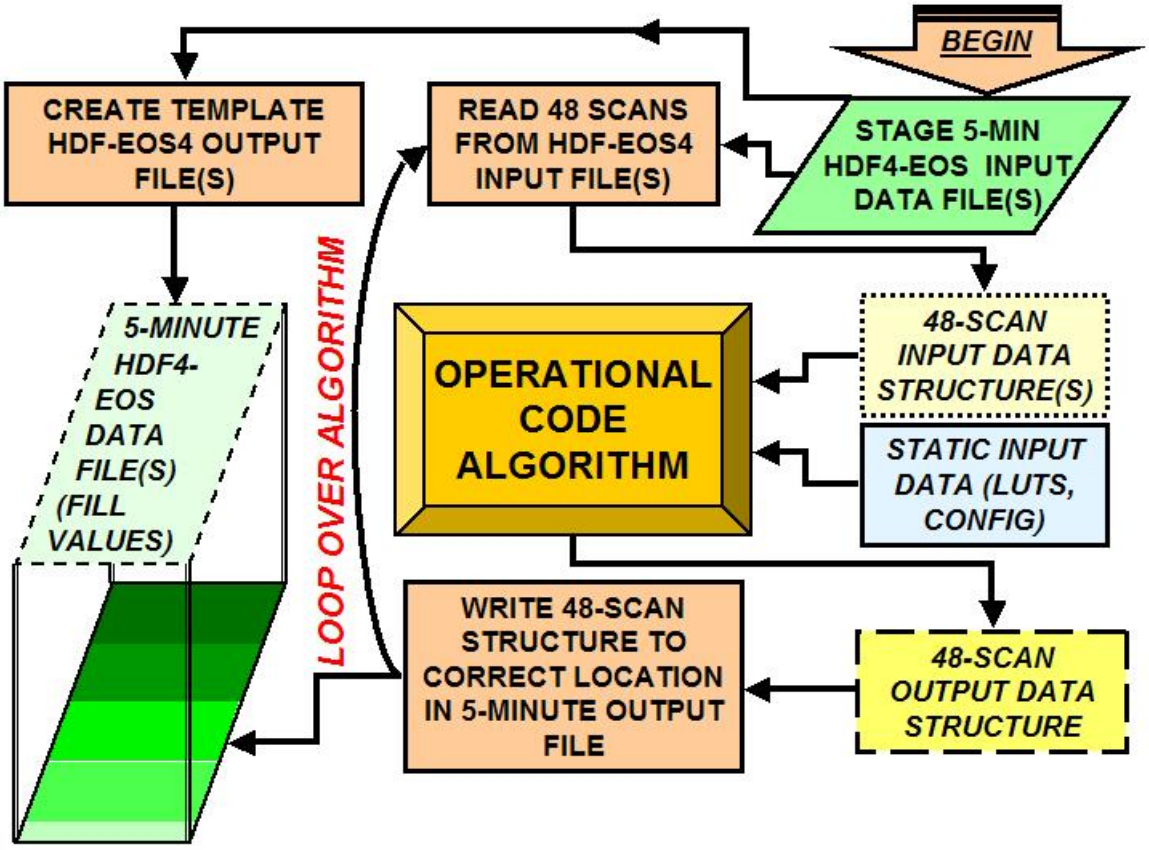


Figure 3-9 Land PEATE Operational Code Wrapper Concept

3.7.2 The Land PEATE C++ Wrapper and Integration of Operations Code

The Operational Code is designed to run in a large memory system at IDPS. The code reads and writes data entirely in memory, thus requiring no file interface between algorithms. Therefore IDPS Operations (OPS) Code will in addition to MODIS-like PGE scripts need "Wrappers" around the OPS Code to run at NPPDAPS. The NPPDAPS Operational System will be used for testing in the operations environment. The Land PEATE Integration Team is evaluating and developing components for a Wrapper.

OPS Code that has been enhanced with improved algorithms by the Science Team is also labeled as ST Code. However this ST Code is stored in the OPS branch of Subversion by CM as described in Section 3.6. Its integration into NPPDAPS should not require the same type of stubbing-out of external interfaces to a large memory system and the development of a C++ wrapper as is required by the IDPS OPS Code.

The Land PEATE Integration Team is designing a generic main driver code written in C++ Language to wrap the core algorithms in the IDPS Operations Code. The external dependencies on the IDPS system, such as libraries, must be removed or stubbed out before the code can be compiled. The core algorithm remains intact. In addition all calls to retrieve data in defined structures from persistent dynamic memory and calls to output data to other defined structures in persistent dynamic memory must be replaced by calls to read from HDF files and write data to HDF files, respectively. The defined internal structures will be the standard type of structures for which memory is dynamically allocated in C and C++ programs. Since IDPS Operations Code processes 48 scans at a time, the driver will process the entire 5-minute input granule for a Level 2 PGE by invoking the core algorithm as many times as necessary to complete the 5 minutes. Parameter files and other inputs, with minor tweaks if necessary, will allow the same driver to be used for all science algorithms in IDPS Operations Code. Figure 3-9 shows the Land PEATE Operational Code Wrapper Concept.

3.7.3Integration and Test Procedure

The basic procedural steps in the Land PEATE integration and test are the following:

- Land PEATE Integration Team and CM obtain the IDPS Operational Code containing the science algorithms and the test data from CasaNOSA or the mini-IDPS.

- To enable the Operational Algorithm to run at NPPDAPS, the Integration Team must remove or stub out all IDPS external dependencies from the core operational code so that it contains only the science algorithm.

- The Land PEATE Integration Team writes a C++ code main routine wrapper and the Land PEATE driver for the new Operations Code.

- The Integration Team integrates the algorithm code into PGEs and writes the associated process drivers and PGE scripts for running the PGE code under Linux at the NPPDAPS Facility.

- The Integration Team tests the integrated PGEs by running the PGEs from the command line and compares the output test products to test data from CasaNOSA if these test data are available.

- The NPPDAPS Group registers new product ESDTs into NPPDAPS Databases.

- The NPPDAPS group writes the NPPDAPS-type loaders to stage data and writes a Recipe containing the PGEs to enable the code to run in the NPPDAPS environment.

- The Integration Team tests the PGEs in the development instance of NPPDAPS.

- The Integration Team delivers the Recipes with PGEs and test data to CM for baseline and chain testing.

- The Land PEATE Integration Team runs the Recipes containing the PGEs under the NPP system testing instance and compares output test data products to test data from CasaNOSA. If not successful, the integration steps above are repeated.

- If successful, CM installs Recipes and PGEs into NPPDAPS Operations.

- The Integration Team receives updated Operations Code (modified to run in a file-oriented environment) with enhanced science algorithms from one of the VIIRS Science Team members. No additional input/output file wrappers should be needed. The remainder of the integration process is essentially the same for NGST SCI Code and IDPS OPS Code.

- The Integration Team integrates ST Code into PGEs and Recipes for NPPDAPS environment and tests the code using necessary steps from above. The ST Code should already contain file input/output routines.

- CM installs and runs Recipes with PGEs containing Science Team Code in NPPDAPS Operations to verify that the Science Team Code runs correctly.

- The Land PEATE and its Integration Team compare test data products made from the improved science algorithms at NPPDAPS to corresponding test data from the VIIRS Science Team.

- If there are errors in the NPPDAPS version of the code, it is corrected and run through the above procedures until it is ready for use by the Land PEATE in NPPDAPS.

3.8 Land PEATE Data Processing

The Land PEATE processes the VIIRS science data at the NPPDAPS Facility in order to accomplish its primary task of assessing the VIIRS EDRs made by IDPS using the Operational

Code and making recommendations for improvements to the algorithms in the Operational Code to make the EDRs of Climate Data quality. The Land PEATE compares the EDRs made by the Operational Code and the proposed enhancements to reference data sets, such as MODIS data sets. If there are gross differences in the operationally produced EDRs, the Land PEATE reports the differences to the VIIRS Science Team for their recommendations. If the enhanced algorithm code is better, then the Science Team can request the Land PEATE to submit the enhancements to the PSOE for submission to the CCB.

3.8.1 Overview of Mission Data Processing Requirements for Land PEATE

The Land PEATE primarily obtains VIIRS science data and related ancillary data through requests to the SD3E followed by FTP of the data when it becomes available from ADS or ADP. The requirements for these activities are listed in the NPOESS NPP Science Data Segment Requirements Specification - GSFC 429-05-11-01, April 7, 2005.

- Extract RDR, SDR, and EDR data of interest for quality evaluation, selected subset processing, and algorithm enhancements.
- Ingest data through SD3E within current 32-day period, outside 32-day window from ADS, alternate ancillary from ADP.
- Use optional interface with the Mini-IDPS at I&TSE to evaluate the performance of the recommended algorithm enhancement.
- Coordinate calibration evaluation and validation with NICSE and submit algorithm and calibration enhancements and recommendations to PSOE.
- Receive ancillary data, operational calibration updates, and algorithm source code for generation of data products from ADS.
- Work with the Science team to achieve their objectives (receive updated science algorithms and test data, integrate and run algorithms, compare to operations algorithm runs).

3.8.2 Overview of Additional Pre-Launch Data Processing Requirements for Land PEATE

- Obtain pre-launch science algorithms and test data

- Obtain pre-launch operational algorithm code, wrappers, and test data from NOAA's CasaNOSA Web Site. CasaNOSA has replaced NEXT in the original project requirements.

3.8.3Registration of ESDTs into NPPDAPS Databases

All ESDTs must be registered in the NPPDAPS Database before any products of these types can be ingested, generated, stored, or retrieved under the NPPDAPS Production System. The information required to store and retrieve new VIIRS and ancillary data products is entered into the Earth Science Data Type (ESDT) Definition Table and File Type Definition Table in the NPPDAPS Database at registration. These database tables consist of fields that will uniquely identify each type of product. The primary fields needed to describe the products for the PGEs are the product ShortName and LongName. The naming conventions for these fields are modeled on the MODIS standard naming conventions, which have been described in Section 3.3.1 and Section 3.3.2.

3.8.4Overview of NPPDAPS Generation of VIIRS Science Data

NPPDAPS is a data-driven processing system. The Science Algorithms, either from the Operational Code or the enhanced code from the Science Team, are integrated into PGEs, incorporated into Recipes, tested by the Land PEATE Integration Team, and delivered to CM for installation into an instance of the NPPDAPS Operational System. The availability of the input data determines when a PGE is run.

PGEs are organized into Recipes according to the processing level, similarity of data products, and similarity of types of input data. Each successive Recipe runs the PGEs for a particular chain of products. Based upon experience from MODIS data processing, recipes may run only part of a logical chain of PGEs. Recipes will be planned by NPPDAPS Production Analysts and when input data become available, the NPPDAPS Operational System activates the Recipes. NPPDAPS is designed to close daily recipes when all of the data for that day have been processed or missing data are determined to be unavailable in time to keep the planned processing on schedule.

The Land PEATE and its Integration Team will integrate VIIRS Science Algorithms for processing in NPPDAPS based upon the requirements for VIIRS science product evaluation from the VIIRS Science Team. Science Team members will deliver their Science Team Code containing enhancements made to the current Operations Code to the Land PEATE for extensive science testing. Some additional algorithms must also be included to generate the input products needed for the primary land product algorithms. All of these algorithms are

packaged into the PGEs to be run at NPPDAPS. Table 3-7 lists the PGEs sorted by PGE number and their generated products by ESDT ShortName and corresponding LongName. The table includes the L0 data required for PGE301 Geolocation and external ancillary data products that are ingested to NPPDAPS for input to the granulation PGEs.

Table 3-7 Launch-Ready Operations Code Chain and Pre-Launch Science Code Chain ESDT ShortNames, LongNames, and Generating PGE or Ingest Source

Generating PGE Name/Description or Ingest Source	Product ESDT ShortName	Product ESDT LongName
PGE301 VIIRS L1 Geolocation	NPP IMFT L1	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
PGE301 VIIRS L1 Geolocation	NPP MOFT L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
PGE301 VIIRS L1 Geolocation	NPP DNFT L1	VIIRS/NPP Day/Night Band Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
PGE301 VIIRS L1 Geolocation	NPP UDGTGIP L1	VIIRS/NPP Unaggregated Dual Gain Band Terrain Corrected Geolocation 5-Min L1 Swath IP
PGE302 VIIRS L1 Calibration	NPP VIAE L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
PGE302 VIIRS L1 Calibration	NPP VMAE L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
PGE302 VIIRS L1 Calibration	NPP VDNE L1	VIIRS/NPP Day/Night Band 5-Min L1 Swath SDR 375m
PGE302 VIIRS L1 Calibration	NPP VOBCIP L1	VIIRS/NPP On-Board Calibrator (OBC) IP
PGE302 VIIRS L1 Calibration	NPP VCDGIP L1	VIIRS/NPP Calibrated Dual Gain Band IP
PGE303 VIIRS L2 Cloud Mask	NPP CMIP L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m
PGE304 VIIRS L2 Aerosol Optical Thickness	NPP VAOT L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath EDR 750m
PGE304 VIIRS L2 Aerosol Optical Thickness	NPP VAOTIP L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
PGE304 VIIRS L2 Aerosol Optical Thickness	NPP VAMIIP L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m

Generating PGE Name/Description or Ingest Source	Product ESDT ShortName	Product ESDT LongName
PGE304 VIIRS L2 Aerosol Optical Thickness	NPP VAQFIP L2	VIIRS/NPP Aerosol Quality Flags 5-Min L2 Swath IP 750m (Output of 2007 OPS Code and SCI code; not in EDR-IR)
PGE306 VIIRS L2 Cloud Optical Properties	NPP VCOPIP L2	VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m
PGE306 VIIRS L2 Cloud Optical Properties	NPP WCTTIP L2	VIIRS/NPP Ice & Night Water Cloud Top Temperature 5-Min L2 Swath IP 750m
PGE307 VIIRS L2 Snow Cover	NPP VSCD L2	VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m
PGE307 VIIRS L2 Snow Cover	NPP VSCDIP L2	VIIRS.NPP Snow Cover (Float32) 5-Min L2 Swath IP 750m (Output of 2007 OPS code; not in EDR-IR)
PGE307 VIIRS L2 Snow Cover	NPP VSCMQ L2	VIIRS/NPP Snow Cover Map & Quality 5-Min L2 Swath IP 375m (Output of 2007 OPS code; not in EDR-IR)
PGE308 VIIRS L2 Sea Ice Characterization & Ice Age	NPP VSIC L2	VIIRS/NPP Sea Ice Characterization/Ice Age 5-Min L2 Swath EDR 375m
PGE308 VIIRS L2 Sea Ice Characterization & Ice Age	NPP VIAIP L2	VIIRS/NPP Ice Albedo 5-Min L2 Swath IP 375m
PGE311 VIIRS L2 Land Surface Reflectance	NPP SRFLIP L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m (Not output of SCI code; in EDR-IR)
PGE311 VIIRS L2 Land Surface Reflectance	NPP SRFLMIP L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m (Output of SCI code; not in EDR-IR)
PGE311 VIIRS L2 Land Surface Reflectance	NPP SRFLIIP L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m (Output of SCI code; not in EDR-IR)
PGE313 VIIRS Daily Surface Reflectance Collection Gridding	NPP DSRFIP L3	VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km
PGE314 VIIRS Snow/Ice Cover Gridding	NPP VSNICIP L3	VIIRS/NPP Gridded Snow/Ice Cover Cont. L3 Global IP 1km
PGE315 VIIRS Previous Ice Age Gridding	NPP VPIAIP L3	VIIRS/NPP Gridded Previous Ice Age Cont. L3 Global IP 1km
PGE316 VIIRS L2 Land Surface Temperature	NPP VLST L2	VIIRS/NPP Land Surface Temperature 5-Min L2 Swath EDR 750m
PGE317 VIIIRS 17 Day NBAR NDVI Gridding	NPP VNDVIIP L3	VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km

Generating PGE Name/Description or Ingest Source	Product ESDT ShortName	Product ESDT LongName
PGE318 VIIRS Monthly Product CV-MVC Gridding	NPP MBTSRVIIP L3	VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km
PGE319 VIIRS 17-Day Land Albedo Gridding	NPP D17LALBIP L3	VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km
PGE319 VIIRS 17-Day Land Albedo Gridding	NPP D17BRDFIP L3	VIIRS/NPP Gridded BRDF Archetypal 17-Day L3 Global IP 1km
PGE330 VIIRS L2 Active Fires	NPP AVAF L2	VIIRS/NPP Active Fires 5-Min L2 Swath ARP 750m
PGE330 VIIRS L2 Active Fires	NPP VAFIP L2	VIIRS/NPP Fire Mask & Quality Flags 5-Min L2 Swath IP 750m (Output of 2007 OPS code; not in EDR-IR)
PGE341 VIIRS Quarterly Surface Type Gridding	NPP QSIP L3	VIIRS/NPP Gridded Surface Type Quarterly L3 Global IP 1km
PGE341 VIIRS Quarterly Surface Type Gridding	NPP QMMVIIP L3	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L3 Global IP 1km
PGE349 VIIRS L2 Surface Type	NPP VSUT L2	VIIRS/NPP Surface Type 5-Min L2 Swath EDR 750m
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP AIRTIP L2	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP COZIP L2	NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP HGHTIP L2	NCEP Geopotential Surface Height 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP PRESIP L2	NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP PRWIP L2	NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)

Generating PGE Name/Description or Ingest Source	**Product ESDT ShortName**	**Product ESDT LongName**
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP WDIRIP L2	NCEP Surface Wind Direction 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP WSPDIP L2	NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP AMPIP L2	NCEP Atmospheric Moisture Profile 5-Min L2 Swath IP 750m Granulation
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP ATPIP L2	NCEP Atmospheric Temperature Profile 5-Min L2 Swath IP 750m Granulation
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	NCEP GHPIP L2	NCEP Geopotential Height Profile 5-Min L2 Swath IP 750m Granulation
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation **(Note (2))**	**NCEP GFSIP L2** **(EDR-IR has one file containg all parameters as output. SCI code has separate files for each parameter)**	NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation One file with contents: Geopotential Height of Surface Isobaric Level Temperature Relative Humidity at Pressure Levels Sea Level Pressure Sea Surface Winds (Speed & Direction; U & V) Specifiic Humidity at Surface Surface Air Temperature Surface Pressure (Adjusted) Total Column Ozone Total Column Precipitable Water Tropopause Height Water Vapor Mixing Ratio at Pressure Levels
PGE351 VIIRS NAAPS Total Optical Depth 750m Granulation	NAAPS TODIP L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation
PGE352 VIIRS Global Land Cover 750m Granulation	USGS ECOSIP L2	USGS GLCC Olson Global Ecosystems 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m &375m Granulation	NPP VSNICIP L2	VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation

Generating PGE Name/Description or Ingest Source	Product ESDT ShortName	Product ESDT LongName
PGE353 VIIRS Gridded IP 750m & 375m Granulation	NPP VNDVIIP L2	VIIRS/NPP Gridded NBAR NDVI 17-Day 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m &375m Granulation	NPP D17LALBIP L2	VIIRS/NPP Gridded Land Albedo 17-Day 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m & 375m Granulation	NPP D17BRDFIP L2	VIIRS/NPP Gridded BRDF Archetypal 17-Day 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m& 375m Granulation	NPP QSIP L2	VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m &375m Granulation	NPP QMMVIIP L2	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m & 375m Granulation	NPP VPIAIP L2	VIIRS/NPP Gridded Previous Ice Age 5-Min L2 Swath IP 375m Granulation
PGE355 VIIRS L2 Land Albedo	NPP VLAIP L2	VIIRS/NPP Land Albedo 5-Min L2 Swath IP 750m
PGE356 VIIRS L2 Vegetation Index	NPP VRVI L2	VIIRS/NPP Vegetation Index 5-Min L2 Swath EDR 375m
PGE356 VIIRS L2 Vegetation Index	NPP SVVIIP L2	VIIRS/NPP Leaf Area Index/FPAR 5-Min L2 Swath IP 375m (Output of SCI code; not in EDR-IR)
PGE360 VIIRS MODIS Land-Water Mask 750m Granulation	MODIS LWMIP L2	MODIS Land-Water Mask 5-Min L2 Swath IP 750m Granulation
PGE370 VIIRS L2 Ice Quality	NPP VIQIP L2	VIIRS/NPP Ice Quality 5-Min L2 Swath IP 375m
PGE370 VIIRS L2 Ice Quality	NPP VIWIP L2	VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m
PGE371 VIIRS L2 Ice Surface Temperature 375m	NPP VSTIP L2	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath IP 375m
PGE373 VIIRS L2 Ice Surface Temperature 750m	NPP VIST L2	VIIRS/NPP Ice Surface Temperature 5-Min L2 swath EDR 750m
PGE374 VIIRS L2 Ice Concentration	NPP VIRTIP L2	VIIRS/NPP Ice Reflectance/Temperature 5-Min L2 Swath IP 375m
PGE374 VIIRS L2 Ice Concentration	NPP VICIP L2	VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m

Generating PGE Name/Description or Ingest Source	**Product ESDT ShortName**	**Product ESDT LongName**
PGE376 VIIRS NOGAPS 750m Granulation	NOGAPS GFSIP L2	NOGAPS Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation One file or multiple parameter files with contents: Geopotential Height of Surface Isobaric Level Temperature Relative Humidity at Pressure Levels Sea Level Pressure Sea Surface Winds (Speed & Direction; U & V) Specifiic Humidity at Surface Surface Air Temperature Surface Pressure (Adjusted) Total Column Precipitable Water Tropopause Height Water Vapor Mixing Ratio at Pressure Levels
PGE381 VIIRS L2 Aerosol Particle Size	NPP VAPS L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath EDR 750m
PGE381 VIIRS L2 Aerosol Particle Size 750m	NPP VAPSIP L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath IP 750m
PGE383 VIIRS L2 Retrieve Aerosol EDRs (In EDR-IR only; separate PGEs in SCI & 2007 OPS code) **(Note (3))**	NPP VAOT L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath EDR 750m
PGE383 VIIRS L2 Retrieve Aerosol EDRs (In EDR-IR only; separate PGEs in SCI & 2007 OPS code)	NPP VAOTIP L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
PGE383 VIIRS L2 Retrieve Aerosol EDRs (In EDR-IR only; separate PGEs in SCI & 2007 OPS code)	NPP VAMIIP L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m
PGE383 VIIRS L2 Retrieve Aerosol EDRs (In EDR-IR only; separate PGEs in SCI & 2007 OPS code)	NPP VAPS L2	VIIRS/NPP Aerosol Particle Size Parameters 5-Min L2 Swath EDR 750m

Generating PGE Name/Description or Ingest Source	**Product ESDT ShortName**	**Product ESDT LongName**
PGE383 VIIRS L2 Retrieve Aerosol EDRs (In EDR-IR only; separate PGEs in SCI & 2007 OPS code)	NPP VAPSIP L2	VIIRS/NPP Aerosol Particle Size Parameters 5-Min L2 Swath IP 750m
PGE383 VIIRS L2 Retrieve Aerosol EDRs (In EDR-IR only; separate PGEs in SCI & 2007 OPS code)	NPP VSUM L2	VIIRS/NPP Suspended Matter 5-Min L2 Swath EDR 750m
PGE385 VIIRS L2 Suspended Matter	NPP VSUM L2	VIIRS/NPP Suspended Matter 5-Min L2 Swath EDR 750m
IDPS Operational Data	NPP RVIRS L0	VIIRS/NPP Decompressed Raw Instrument Science Packets 5-Min L0 RDR
IDPS Operational Data	NPP VIRTE L0	NPP Spacecraft Ephemeris RDR
IDPS Operational Data	NPP VIRTA L0	NPP Spacecraft Attitude RDR
Jet Propulsion Laboratory (JPL)	NA	Planetary Ephemeris Files
MODIS External Ancillary Data (Static)	MODIS LWM ANC (Static)	MODIS Gridded Land-Water Mask L3 Global 30 arc-seconds
NAAPS External Ancillary Data	NAAPS TOD ANC	NAAPS Total Optical Depth L3 Global
NCEP External Ancillary Data	NCEP GFS ANC (In GDAS_0ZF for SCI code and 2007 OPS code)	NCEP Global Forecast System Parameters 6-Hour L3 Global 1Deg 1 Degree NCEP GDAS consists of one Time Interpolated file with contents: Geopotential Height of Surface Isobaric Level Temperature Relative Humidity at Pressure Levels Sea Level Pressure Sea Surface Winds (U & V Components) Specifiic Humidity at Surface Surface Air Temperature Surface Pressure Total Column Ozone Total Column Precipitable Water Tropopause Height Water Vapor Mixing Ratio at Pressure Levels
NOGAPS External Ancillary Data	NOGAPS GFS ANC	NOGAPS Global Forecast System Parameters 6-Hour L3 Global 1Deg
United States Naval Observatory	NA	Leap Second TAI-UTC & Julian Date

Generating PGE Name/Description or Ingest Source	Product ESDT ShortName	Product ESDT LongName
United States Naval Observatory	NA	UTC Pole UT1-UTC & UTC Date Earth Wobble in Rotation
USGS External Ancillary Data (Static)	USGS ECOS ANC (Static)	USGS GLCC Ecosystems L3 Global 30 arc-seconds

Notes:

1. PGE descriptions, inputs, and outputs are based on the EDR Interdependency Report (EDR-IR) Rev A Draft 15, June 30, 2006
2. Second version of PGE350 with product NCEP_GFSIP_L2 is in bold because the EDR-IR indicates that all parameters are in one file. The SCI code outputs separate parameters. No definite NPP Project decision has been made at the time of this document.
3. PGE 383 is in bold because it may replace PGE304, PGE381, and PGE385 as indicated in the EDR-IR Rev A Draft 15, June 30, 2006 version. The 2007 OPS Code has the algorithms in the three PGEs. No definite NPP Project decision has been made at the time of this document.

Table 3-8 contains more detailed information about the VIIRS PGEs to be processed. The table includes a brief description of each PGE, the VIIRS input products, external ancillary input products, and the output products associated with each PGE. Products are listed by their LongNames at NPPDAPS. This table groups the PGEs by product types in the approximate order in which the PGEs are run in chains at NPPDAPS. The logical chains run from Level 1 to Active Fires and Atmosphere PGEs to Land PGEs and finally to Ice PGEs. The granulation and gridding PGEs are listed last. The PGE descriptions, input data, and output data in the table are based on the latest available version of the EDR Interdependency Report (EDRIR), which describes the IDPS Operations Code. However, any differences between the Operations Code and the NGST Science Code delivered to CasaNOSA and modified to run at NPPDAPS are identified by Italics and bold print. The exact data set source of some of the NCEP (or alternative NOGAPS) ancillary data parameters is still being determined.

Table 3-8 VIIRS PGE Descriptions, Input Data and Output Data

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE301 VIIRS L2 Geolocation Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Decompressed Raw Instrument Science Packets 5-Min L0 RDR Spacecraft Ephemeris RDR Spacecraft Attitude RDR		VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m VIIRS/NPP Day/Night Band Terrain Corrected Geolocation 5-Min L1 Swath IP 375m VIIRS/NPP Unaggregated Dual Gain Band Terrain Corrected Geolocation 5-Min L1 Swath IP
PGE302 VIIRS L2 Radiometric Calibration Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Decompressed Raw Instrument Packets 5-Min L0 RDR VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m VIIRS/NPP Day/Night Band Terrain Corrected Geolocation 5-Min L1 Swath IP 375m VIIRS/NPP Unaggregated Dual Gain Band Terrain Corrected Geolocation 5-Min L1 Swath IP VIIRS/NPP Reflective Bands Gain Coefficient L1 Swath IP		VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Day/Night Band 5-Min L1 Swath SDR 375m VIIRS/NPP On Board Calibrator (OBC) IP VIIRS/NPP Calibrated Dual Gain Band IP
PGE330 VIIRS L2 Active Fires Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Gridded Quarterly Surface Types L2 Swath IP 750m Granulation	MODIS Land-Water Mask 5-Min L2 Swath IP 750m Granulation (Not used in 2007 OPS code)	VIIRS/NPP Active Fires 5-Min L2 Swath ARP 750m VIIRS/NPP Fire mask & Quality Flags 5-Min L2 Swath IP 750m (In 2007 OPS code; not in EDR-IR)

PGE Name and Description	**VIIRS Input Data Sets**	**Ancillary Input Data Sets**	**VIIRS Output Data Sets**
PGE303 VIIRS L2 Cloud Mask Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation VIIRS/NPP Gridded NBAR NDVI 17-Day 5-Min L2 Swath IP 750m Granulation VIIRS/NPP Active Fires 5-Min L2 Swath EDR 750m (In EDR-IR; not in SCI code) VIIRS/NPP Gridded Surface Type Quarterly L2 Swath IP 750m Granulation In EDR-IR; not in OPS code)	NCEP or *NOGAPS*: NCEP Global Forecast System Parameters L2 Swath 750m Granulation EDR-IR indicates IDPS Operations Code has one file with all parameters. NGST Science Code and 2007 OPS code have separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation (Sea Surface Winds (Speed & Direction)) (Surface Air Temperature) (Total Column Precipitable Water)) MODIS Land-Water Mask L2 Swath 750m Granulation (In EDR-IR; not in SCI code)	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE304 VIIRS L2 Aerosol Optical Thickness Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe. (Replaced by PGE383 Retrieve Aerosol EDRs in new version of EDR-IR.)	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m	NCEP or NOGAPS: NCEP Global Forecast System Parameters L2 Swath 750m Granulation EDR-IR indicates IDPS Operations Code has one file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation (Geopotential Height of Surface) (Sea Surface Winds (Speed & Direction)) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Ozone) Concentration) (Total Column Precipitable Water) NAAPS Total Optical Depth L2 Swath IP 750m Granulation (In EDR-IR only) OMPS/NPP Total Column Ozone First Guess L2 Swath EDR 750m (Post-launch)	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath EDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m
PGE381 VIIRS L2 Aerosol Particle Size (Replaced by PGE383 Retrieve Aerosol EDRs in new version of EDR-IR.)	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m		VIIRS/NPP Aerosol Particle Size 5-Min L2 Swath EDR 750m VIIRS/NPP Aerosol Particle Size 5-Min L2 Swath IP 750m
PGE385 VIIRS L2 Suspended Matter (Replaced by PGE383 Retrieve Aerosol EDRs in new version of EDR-IR.)	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Particle Size 5-Min L2 Swath IP 750m		VIIRS/NPP Suspended Matter 5-Min L2 Swath EDR 750m

PGE Name and Description	**VIIRS Input Data Sets**	**Ancillary Input Data Sets**	**VIIRS Output Data Sets**
PGE383 VIIRS L2 Retrieve Aerosol EDRs **Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.** **(May replace PGE304 Aerosol Optical Thickness, PGE381 Aerosol Particle Size, and PGE385 Suspended Matter in as indicated in EDR-IR.)**	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m	NCEP or NOGAPS: NCEP Global Forecast System Parameters L2 Swath 750m Granulation EDR-IR indicates IDPS Operations Code has one file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation (Surface Pressure (Adjusted)) (Sea Surface Winds (Speed & Direction)) (Surface Air Temperature) (Total Column Ozone) (Total Column Precipitable Water) NAAPS Total Optical Depth L2 Swath IP 750m Granulation (In EDR-IR; not in SCI or 2007 OPS code) OMPS/NPP Total Column Ozone First Guess L2 Swath EDR 750m (Post-launch)	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath EDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m ***VIIRS/NPP Aerosol* Particle Size 5-Min L2 Swath EDR 750m** **VIIRS/NPP Aerosol Particle Size 5-Min L2 Swath IP 750m** **VIIRS/NPP Suspended Matter 5-Min L2 Swath EDR 750m** (In EDR-IR; not in SCI or 2007 OPS code)

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE306 VIIRS L2 Cloud Optical Properties Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m	NCEP or NOGAPS: NCEP Global Forecast System Parameters L2 Swath 750m Granulation EDR-IR indicates IDPS Operations Code has one file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation NCEP Atmospheric Moisture Profile L2 Swath 750m Granulation NCEP Atmospheric Temperature Profile L2 Swath 750m Granulation NCEP Corresponding Pressure Levels L2 Swath IP 750m Granulation NCEP Geopotential Height Profile L2 Swath IP 750m Granulation	VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m VIIRS/NPP Ice & Night Water Cloud Top Temperature 5-Min L2 Swath IP 750m
PGE311 VIIRS L2 Land Surface Reflectance Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP L2 Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m	NCEP or NOGAPS: NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation EDR-IR indicates IDPS Operations Code has one file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation (Surface Pressure(Adjusted)) (Total Column Ozone) (Total Column Precipitable Water) OMPS/NPP Total Column Ozone First Guess L2 Swath EDR 750m (Post-launch)	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m (In EDR-IR; not in SCI code) VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m (In SCI code; not in EDR_IR)) VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m (In SCI code; not inEDR-IR)

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE307 VIIRS L2 Snow Cover Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-min L2 Swath IP 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m		VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m VIIRS/NPP Snow Cover (Float32) 5-Min L2 Swath IP 750m (In 2007 OPS code; not in EDR-IR) VIIRS/NPP Snow Cover Map & Quality 5-Min L2 Swath IP 375m (In 2007 OPS code; not in EDR-IR)
PGE349 VIIRS L2 Surface Type Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m VIIRS/NPP Active Fires 5-Min L2 Swath ARP 750m VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m VIIRS/NPP Gridded Quarterly Surface Type L2 Swath IP 750m Granulation VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L2 Swath IP 750m Granulation		VIIRS/NPP Surface Type 5-Min L2 Swath EDR 750m

PGE Name and Description	**VIIRS Input Data Sets**	**Ancillary Input Data Sets**	**VIIRS Output Data Sets**
PGE355 VIIRS L2 Land Albedo Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Model Information 5-Min L2Swath IP 750m VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m VIIRS/NPP Gridded Land Albedo 17-Day L2 Swath IP 750m Granulation	NCEP or NOGAPS: NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation IDPS Operations Code indicates one file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation (Total Column Ozone) (Total Column Precipitable Water) OMPS/NPP Total Column Ozone First Guess L2 Swath EDR 750m (Post-launch)	VIIRS/NPP Land Albedo 5-Min L2 Swath EDR 750m
PGE356 VIIRS L2 NDVI Vegetation Index Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m *VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m* VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m (In EDR-IR) VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m (In SCI code) *VIIRS/NPP Gridded* Quarterly Surface Type L2 Swath IP 750m Granulation (In SCI code; not in EDR-IR)		VIIRS/NPP Vegetation Index 5-Min L2 Swath EDR 375m
PGE316 VIIRS L2 Land Surface Temperature Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution 5-min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m VIIRS/NPP Surface Type 5-Min L2 Swath EDR 750m	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation	VIIRS/NPP Land Surface Temperature 5-Min L2 Swath EDR 750m

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE370 VIIRS L2 Ice Quality Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m\ VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation	VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m VIIRS/NPP Ice Quality Flags 5-Min L2 Swath IP 375m
PGE371 VIIRS L2 (Ice) Surface Temperature IP 375m Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m VIIRS/NPP Moderate Resolution 5-min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Ice Quality Flags 5-Min L2 Swath IP 375m VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath IP 375m
PGE374 VIIRS L2 Ice Concentration IP Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m\ VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath IP 375m VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m VIIRS/NPP Ice Quality Flags 5-Min L2 Swath IP 375m		VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m VIIRS/NPP Ice Reflectance/Temperature 5-Min L2 Swath IP 375m
PGE373 VIIRS L2 Ice Surface Temperature 750m Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Cloud Mask 5-min L2 Swath IP 750m VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 750m	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath EDR 750m

PGE Name and Description	**VIIRS Input Data Sets**	**Ancillary Input Data Sets**	**VIIRS Output Data Sets**
PGE308 VIIRS L2 Sea Ice Characterization & Ice Age Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m VIIRS/NPP Ice Quality Flags 5-Min L2 Swath IP 375m VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m VIIRS/NPP Ice Reflectance/Temperature 5-Min L2 Swath IP 375m VIIRS/NPP Gridded Previous Ice Age 5-Min L2 Swath IP 375m Granulation	NCEP or NOGAPS: ***NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation*** IDPS Operations Code: One file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) L2 Swath IP 750m Granulation (Sea Surface Winds (Speed & Direction)) (Specific Humidity at Surface) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Ozone) (Total Column Precipitable Water) NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation OMPS/NPP Total Column Ozone First Guess L2 Swath EDR 750m (Post-launch)	VIIRS/NPP Sea Ice Characterization/Ice Age 5-Min L2 Swath EDR 375m VIIRS/NPP Ice Albedo 5-Min L2 Swath IP 375m

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation Run every VIIRS/NPP granule Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe. (Output parameter granulation files are the only ones currently being produced by PGE350.)	Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m	NCEP Global Forecast System Parameters 6-Hpur L3 Global 1Deg (Post-launch Operations) or NCEP Meteorological Data 6-Hour L3 Global 1Deg (Pre-lainch integration)	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation NCEP Geopotential Surface Height 5-Min L2 Swath IP 750m Granulation NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation NCEP Surface Wind Direction 5-Min L2 Swath IP 750m Granulation NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation NCEP Atmospheric Moisture Profile 5-Min L2 Swath IP 750m Granulation NCEP Atmospheric Temperature Profile 5-Min L2 Swath IP 750m Granulation NCEP Geopotential Height Profile 5-Min L2 Swath IP 750m Granulation

PGE Name and Description	**VIIRS Input Data Sets**	**Ancillary Input Data Sets**	**VIIRS Output Data Sets**
PGE350 **VIIRS NCEP Global Forecast System (GFS) 750m Granulation** **Run every VIIRS/NPP granule** **Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.**	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m	NCEP Global Forecast System Parameters 6-Hour L3 Global 1Deg (Post-launch Operations) or NCEP Meteorological Data 6-Hour L3 Global 1Deg (Pre-lainch integration) EDR-IR indicates one file, with contents: (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Winds (U & V Components)) (Specifiic Humidity at Surface) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Ozone Concentration) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels)	Corresponding Swath Parameters at 750m: NCEP Global Forecast System Parameters 5-Min L2 SwatIh IP 750m Granulation EDR-IR indicates IDPS Operations Code: has one file with all parameters. NGST Science Code: Separate Parameter files: NCEP (parameter) 5-Min L2 Swath IP 750m Granulation (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Winds (Speed & Direction)) (Specifiic Humidity at Surface) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Ozone Concentration) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels) (Atmospheric Moisture Profile) (Atmospheric Temperature Profile) (Geopotential Height Profile)
PGE351 VIIRS NAAPS Total Optical Depth 750m Granulation	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m	NAAPS Total Optical Depth L3 Global 30 arc-seconds	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE352 VIIRS Global Land Cover 750m Granulation Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m	USGS GLCC Olson Ecosystems L3 Global 18km Contents: USGS Global Land Cover Characteristic DB Olson Ecosystems	GLCC Olson Global Ecosystems 5-Min L2 Swath IP 750m Granulation
PGE353 VIIRS Gridded IP 750m and 375m Granulation Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m VIIRS/NPP Gridded Snow/Ice Cover L3 Global IP 1km VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km VIIRS/NPP BRDF Archetypal 17-Day L3 Global IP 1km VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L3 Global IP 1km VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km VIIRS/NPP Gridded Surface Types Quarterly L3 Global IP 1km VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m VIIRS/NPP Gridded Previous Ice Age Global IP 1km		Corresponding Swath Parameters at 750m: VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation VIIRS/NPP Gridded Land Albedo 17-Day L2 Swath IP 750m Granulation VIIRS/NPP BRDF Archetypal 17-Day 5-Min L2 Swath IP 750m Granulation VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly 5-Min L2 Swath IP 750m Granulation VIIRS/NPP Gridded NBAR NDVI 17-Day 5-Min L2 Swath IP 750m Granulation VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation Corresponding Swath Parameters at 375m: VIIRS/NPP Gridded Previous Ice Age 5-Min L2 Swath IP 375m Granulation
PGE360 VIIRS MODIS Land-Water Mask 750m Granulation	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m	MODIS Land-Water Mask L3 Global 30 arc-seconds	MODIS Land-Water Mask 5-Min L2 Swath IP 750m Granulation

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE376 VIIRS NOGAPS 750m Granulation Run every VIIRS/NPP granule Runs every 5 minutes; Maximum 288 times per day in a Daily Recipe.	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m	1 Degree NOGAPS (Time Interpolated): NOGAPS Global Forecast System Parameters 6-Hour L3 Global 1Deg 1 file with contents: (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Winds (U & V Components)) (Specifiic Humidity at Surface) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels)	Corresponding Swath Parameters at 750m: NOGAPS Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation 1 file with contents: (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Winds (Speed & Direction)) (Specifiic Humidity at Surface) (Surface Air Temperature) (Surface Pressure) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels)
PGE314 VIIRS Snow/Ice Cover Gridding Can be run every 5 minutes (maximum of 288 times/day) in a Daily Recipe. NPPDAPS will run it on an orbit basis.	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m VIIRS/NPP Gridded Snow/Ice Cover L3 Global IP 1km		VIIRS/NPP Gridded Snow/Ice Cover L3 Global IP 1km
PGE315 VIIRS Previous Ice Age Gridding Can be run every 5 minutes (maximum 288 times/day) in a Daily Recipe. NPPDAPS will run it on an orbit basis.	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m VIIRS/NPP Sea Ice Characterization/Ice Age 5-Min L2 Swath EDR 375m VIIRS/NPP Gridded Previous Ice Age L3 Global IP 1km		VIIRS/NPP Gridded Previous Ice Age L3 Global IP 1km

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE313 VIIRS Daily Surface Reflectance Collection Gridding Run every day to make Surface Reflectance for a single day. Run up to 17 days for next step.	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m & 750m VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km		VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km
PGE318 VIIRS Monthly Product CV-MVC Gridding Swath-based Surface Reflectance data along with an SDR are used to produce a monthly IP with global grids of BT, SR, & VI. Can be run every 5 minutes (maximum of 288 times/day) in a Daily Recipe. NPPDAPS will run it daily.	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m: (Moderate Resolution Brightness Temperature) VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km		VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km (Retain up to 13 monthly composites of the above collections)
PGE317 VIIRS 17-Day NBAR NDVI Gridding Uses swath-based Surface Reflectance to produce global gridded 17-Day NBAR NDVI. Can be run every 5 minutes (maximum 288 times/ day) in a Daily Recipe. NPPDAPS will run it on an orbit basis.	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m VIIRS/NPP Gridded NBAR NDVI 17_Day L3 Global IP 5km	Quarterly TOC NDVI Climatology	VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km

PGE Name and Description	VIIRS Input Data Sets	Ancillary Input Data Sets	VIIRS Output Data Sets
PGE319 VIIRS 17-Day Land Albedo IP Gridding Generate and replace Albedo entries and update historical Archetypal data every 17 days.	VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km (17 consecutive daily collections) VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km VIIRS/NPP BRDF Archetypal 17-Day L3 Global IP 1km		VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km VIIRS/NPP BRDF Archetypal 17-Day L3 Global IP 1km
PGE341 VIIRS Quarterly Surface Type Gridding Generate and replace every 3 months.	VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km (Retain 12 consecutive monthly collections, grid 3 each quarter.)		VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L3 Global IP 1km VIIRS/NPP Gridded Surface Type Quarterly L3 Global IP 1km

Notes:

1. PGE descriptions, inputs, and outputs are based on the EDR Interdependency Report (EDRIR) Rev A Draft 15 (Base-lined June 30, 2006).
2. PGE383 is in bold because the EDR-IR Rev A Draft 15 (Base-lined June 30, 2006) indicates it may replace PGE304, PGE381, and PGE385. No definite NPP Project decision has been made at the time of this document.
3. The second version of PGE350 with product NCEP_GFSIP_L2 is in bold because the EDR-R Rev A Draft 15 (Base-lined June 30, 2006) indicates that all parameters are in one file. The SCI Code outputs separate parameter files. No definite NPP Project decision has been made at the time of this document.

3.8.5NPPDAPS Ingest

During the NPP Mission NPPDAPS will ingest the required VIIRS and ancillary data from SD3E FTP site as the data become available and will store the data for input to the PGEs. VIIRS data and external ancillary data are put into a NPPDAPS archive for NPP data that contains directories similar to the MODIS data archive. Associated static data are stored in NPP directories that are also similar to MODIS directories. In general up to 32 days of data remain on-line. Products that are needed to make or update quarterly

and yearly products or perform trend analysis may stay on-line for as long as they are needed.

During the pre-launch period, NPPDAPS plans to ingest the algorithm code and test data from CasaNOSA. VIIRS test data will be made as a joint effort by NPP groups at NOAA and by the Land PEATE.

During the mission IDPS will be installed at multiple Centrals. The Land PEATE will get its data from the NESDIS Central. SD3E will obtain the current xDR data directly from IDPS at NESDIS Central and CLASS and will obtain retained IPs and Calibration/Validation (Cal/Val) data from NPOESS Science Investigator-led Processing System (NSIPS). SD3E will then stage the data for the PEATEs. The PEATEs may obtain data more than 32-days old from CLASS.

IDPS will export only a few official IPs to SD3E for the PEATEs. However, NOAA CLASS NSIPS will order a set of Retained IPs from its IDPS instance and export them to SD3E for access by the PEATEs. Land PEATE will require some of the Retained L2 and L3 IPs to compare to the corresponding IPs it is generating from VIIRS PGEs at NPPDAPS for product evaluations. Table 3-9 shows the Retained IPs that Land PEATE will be getting from NSIPS via SD3E and the frequency at which each IP is required. Land PEATE will only order the IPS for time periods that the Science Team is evaluating. The VIIRS Granulation products will only be required occasionally to verify that the PEATE's PGEs are producing the same results as IDPS.

Table 3-9 Retained IP VIIRS Products Required by Land PEATE from NSIPS

NPPDAPS ESDT ShortName	NPPDAPS Product LongName	NPPDAPS PGE VIIRS Algorithm	Frequency Required	Note
NPP UDGTGIP L1	VIIRS/NPP Unaggregated Dual Gain Band Terrain Corrected Geolocation 5-Min L1 Swath IP	PGE301 VIIRS L1 Geolocation	Once per 5 Minutes	
NPP VOBCIP L1	VIIRS/NPP On Board Calibrator (OBC) IP	PGE302 VIIRS L1 Calibration	Once per 5 Minutes	
NPP VCDGIP L1	VIIRS/NPP Calibrated Dual Gain Band IP	PGE302 VIIRS L1 Calibration	Once per 5 Minutes	
NPP VAOTIP L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m	PGE304 VIIRS L2 Aerosol Optical Thickness	Once per 5 Minutes	
NPP VAMIIP L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m	PGE304 VIIRS L2 Aerosol Optical Thickness	Once per 5 Minutes	

NPPDAPS ESDT ShortName	NPPDAPS Product LongName	NPPDAPS PGE VIIRS Algorithm	Frequency Required	Note
NPP VAPSIP L2	VIIRS/NPP Aerosol Particle Size Parameters 5-Min L2 Swath IP 750m	PGE381 VIIRS L2 Aerosol Particle Size	Once per 5 Minutes	2
NPP VCOPIP L2	VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m	PGE306 VIIRS L2 Cloud Optical Properties	Once per 5 Minutes	
NPP WCTTIP L2	VIIRS/NPP Ice & Night Water Cloud Top Temperature 5-Min L2 Swath IP 750m	PGE306 VIIRS L2 Cloud Optical Properties	Once per 5 Minutes	
NPP SRFLIP L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m	PGE311 VIIRS L2 Land Surface Reflectance	Once per 5 Minutes	
NPP VLAIP L2	VIIRS/NPP Land Albedo 5-Min L2 Swath IP 750m	PGE355 VIIRS L2 Land Albedo	Once per 5 Minutes	2
NPP VSTIP L2	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath IP 375m	PGE371 VIIRS L2 Ice Surface Temperature 375m	Once per 5 Minutes	
NPP VIQIP L2	VIIRS/NPP Ice Quality 5-Min L2 Swath IP 375m	PGE370 VIIRS L2 Ice Quality	Once per 5 Minutes	
NPP VIWIP L2	VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m	PGE370 VIIRS L2 Ice Quality	Once per 5 Minutes	
NPP VICIP L2	VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m	PGE374 VIIRS L2 Ice Concentration	Once per 5 Minutes	
NPP VIRTIP L2	VIIRS/NPP Ice Reflectance/Temperature 5-Min L2 Swath IP 375m	PGE374 VIIRS L2 Ice Concentration	Once per 5 Minutes	
NPP VIAIP L2	VIIRS/NPP Ice Albedo 5-Min L2 Swath IP 375m	PGE308 VIIRS L2 Sea Ice Characterization & Ice Age	Once per 5 Minutes	2

NPPDAPS ESDT ShortName	NPPDAPS Product LongName	NPPDAPS PGE VIIRS Algorithm	Frequency Required	Note
NCEP GFSIP L2	NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation One file with contents: (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Winds (Speed & Direction)) (Specifiic Humidity at Surface) (Surface Air Temperature) (Surface Pressure) (Total Column Ozone Concentration) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels) (Atmospheric Moisture Profile) (Atmospheric Temperature Profile) (Geopotential Height Profile) or separate parameter files.	PGE350 VIIRS NCEP Global Forecast System (GFS) 750m Granulation	Once per Month	1, 2
NCEP_AIRTIP_L2	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2
NCEP COZIP L2	NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2

NPPDAPS ESDT ShortName	NPPDAPS Product LongName	NPPDAPS PGE VIIRS Algorithm	Frequency Required	Note
NCEP HGHTIP L2	NCEP Geopotential Surface Height 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2
NCEP PRESIP L2	NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2
NCEP PRWIP L2	NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2
NCEP WDIRIP L2	NCEP Surface Wind Direction 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2
NCEP WSPDIP L2	NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation (SCI code and 2007 OPS code; EDR-IR assumes one file output)	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1,2
NCEP AMPIP L2	NCEP Atmospheric Moisture Profile 5-Min L2 Swath IP 750m Granulation	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1, 2
NCEP ATPIP L2	NCEP Atmospheric Temperature Profile 5-Min L2 Swath IP 750m Granulation	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1, 2
NCEP GHPIP L2	NCEP Geopotential Height Profile 5-Min L2 Swath IP 750m Granulation	PGE350 VIIRS NCEP Ancillary Data Profile Generation	Once per Month	1, 2
NOGAPS GFSIP L 2	NOGAPS Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation	PGE376 VIIRS NOGAPS 750m Granulation	Once per Month	1, 2

NPPDAPS ESDT ShortName	NPPDAPS Product LongName	NPPDAPS PGE VIIRS Algorithm	Frequency Required	Note
USGS ECOSIP L2	USGS GLCC Olson Global Ecosystems 5-Min L2 Swath 750m Granulation	PGE352 VIIRS Global Land Cover 750m Granulation	Once per Month	1, 2
NAAPS TODIP L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation	PGE351 VIIRS NAAPS Total Optical Depth 750m Granulation	Once per Month	1, 2
MODIS LWMIP L2	MODIS Land-Water Mask 5-Min L2 Swath IP 750m Granulation	PGE360 VIIRS MODIS Land-Water Mask 750m Granulation	Once per Month	1, 2
NPP VSNICIP L2	VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation	PGE353 VIIRS Gridded IP 750m Granulation	Once per Month	1,, 2
NPP VNDVIIP L2	VIIRS/NPP Gridded NBAR NDVI 17-Day 5-Min L2 Swath IP 750m Granulation	PGE353 VIIRS Gridded IP 750m Granulation	Once per Month	1, 2
NPP VPIAIP L2	VIIRS/NPP Gridded Previous Ice Age 5-Min L2 Swath IP 375m Granulation	PGE353 VIIRS Gridded IP 375m Granulation	Once per Month	1, 2
NPP D17LALBIP L 2	VIIRS/NPP Gridded Land Albedo 17-Day 5-Min L2 Swath IP 750m Granulation	PGE353 VIIRS Gridded IP 750m Granulation	Once per Month	1, 2
NPP D17BRDFIP L 2	VIIRS/NPP Gridded BRDF Archetypal 17-Day 5-Min L2 Swath IP 750m Granulation	PGE353 VIIRS Gridded IP 750m Granulation	Once per Month	1,2
NPP QSIP L2	VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation	PGE353 VIIRS Gridded IP 750m Granulation	Once per Month	1, 2
NPP QMMVIIP L2	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly 5-Min L2 Swath IP 750m Granulation	PGE353 VIIRS Gridded IP 750m Granulation	Once per Month	1, 2
NPP VSNICIP L3	VIIRS/NPP Gridded Snow/Ice Cover Cont. L3 Global IP 1km	PGE314 VIIRS Snow/Ice Cover Gridding	Once per Day	
NPP VNDVIIP L3	VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km	PGE317 VIIRS 17-Day NBAR NDVI Gridding	Once per 17 Days	2
NPP MBTSRVIIP L 3	VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km	PGE318 VIIRS Monthly Product CV-MVC Gridding	Once per Month	
NPP VPIAIP L3	VIIRS/NPP Gridded Previous Ice Age Cont. L3 Global IP 1km	PGE315 VIIRS Previous Ice Age Gridding	Once per Day	

NPPDAPS ESDT ShortName	NPPDAPS Product LongName	NPPDAPS PGE VIIRS Algorithm	Frequency Required	Note
NPP DSRFIP L3	VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km	PGE313 VIIRS Daily Surface Reflectance Collection Gridding	Once per Day	
NPP D17LALBIP L 3	VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km	PGE319 VIIRS 17-Day Land Albedo Gridding	Once per 17 Days	
NPP D17BRDFIP L 3	VIIRS/NPP Gridded BRDF Archetypal 17-Day L3 Global IP 1km	PGE319 VIIRS 17-Day Land Albedo Gridding	Once per 17 Days	2
NPP QMMVIIP L3	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L3 Global IP 1km	PGE341 VIIRS Quarterly Surface Type Gridding	Once per 3 Months	

Note: 1 = Land PEATE requires granulation products for specified time intervals
only upon request
2 = IP is missing in Retained IP Table in EDR/PR

For the suite of PGEs to be run by the Land PEATE, there are only two types of external ancillary data files required, dynamic and static. All of the data parameters in dynamic data files can be obtained from NOAA's NCEP 1 Degree GDAS daily 6-hour global files. If this file is not available for some time period, an alternative file is the Navy's NOGAPS file. NPPDAPS plans to ingest only the NCEP files from NOAA/CLASS Central unless CLASS decides to use the alternative NOGAPS data during periods when NCEP data are not available. The static external ancillary data can be obtained from the USGS Global Land Coverage Characterization (GLCC) Ecosystems Olson Map.

3.8.6Preliminary Preparation of Ancillary Data

The external ancillary data sets are listed in Table 3-10. When the ancillary files are ingested and stored in the archive or data storage area, they are ready to be used in the VIIRS data processing. After NPPDAPS produces each set of L1 Geolocation SDR granules, NPPDAPS runs the VIIRS Ancillary Granulation PGEs to extract swaths of ancillary data matching the VIIRS L1 SDR swaths that are to be used in the VIIRS science data processing for the current processing period. There is one VIIRS Granulation PGE (PGE350) for the NCEP ancillary data, a second VIIRS Granulation PGE (PGE351) for NOGAPS ancillary data, and a third VIIRS Granulation PGE (PGE352) for the USGS ancillary data. These PGEs are described in Table 3-1. The VIIRS Ancillary Granulation algorithms use a nearest neighbor interpolation scheme for the granulation.

Table 3-10 External Ancillary Data for VIIRS Processing

ESDT and Description of Data Set	File Name and Time Coverage	Data Contents Extracted for VIIRS Processing	Use
NCEP Global Forecast System Parameters 6-Hour L3 Global 1 Deg Global Forecast System (GFS) Dynamic Data (If the NCEP 6-hour file is not available at processing time, a corresponding NOGAPS file may be used as the alternative.)	IDPS Operational Code will use the new NCEP GFS data set at 1.0 degree resolution: gfs.yyyymmddhh 6-Hour Product; file covers 6 data hours: hh-3 hours to hh+3 hours from data time in file name. Produced 4 times daily; 2-D and 3-D Gridded (L3) Meteorological Data; GRIB 2 format. Science Code uses the gdas1 data set at 1 degree resolution, with ESDT GDAS_0ZF: gdas1.Pgrb00.yymmdd.hhz 6-Hour Product; file covers 6 data hours: hhZ-3 hours to hhZ+3 hours from data time in file name. Produced 4 times daily; 2-D and 3-D Gridded (L3) Meteorological Data; GRIB 1 format.	Corresponding Swath Parameters at 750m: (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Winds (U & V Components)) (Specifiic Humidity at Surface) (Surface Air Temperature) (Surface Pressure) (Total Column Ozone Concentration) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels)	Input to VIIRS Ancillary Granulation PGE that extracts swaths at 750m.
NAAPS Total Optical Depth L3 Global 30 arc-seconds Naval Research Laboratory Global Data Set for Total Optical Depth	TBD	Corresponding Swath Parameters at 750m: (Total Optical Depth)	Input to VIIRS Ancillary Granulation PGE that extracts swaths at 750m.

ESDT and Description of Data Set	File Name and Time Coverage	Data Contents Extracted for VIIRS Processing	Use
MODIS Land-Water Mask L3 Global 30 arc-seconds	TBD	Corresponding Swath Parameters at 750m (Land-Water Mask)	Input to VIIRS Ancillary Granulation PGE that extracts swaths at 750m.
USGS ECO L3 ANC USGS Global Land Coverage Characterization (GLCC) Olson World Ecosystem Map (Global Maps at 10 minutes ~18 km). Based on AVHRR data. May be replaced by other ancillary data. Static Data	ecosystem.img.vn, where n= version number. Climatology file	Corresponding Swath Parameters at 750m (GLCC Global Ecosystems parameters)	Input to VIIRS Ancillary Granulation PGE that extracts swaths at 750m.
United States Naval Observatory Leap Second Data (no ESDT ShortName)	leapsec.dat Obtained twice a week.	Data to relate Leap Seconds (TAI-UTC) values to UTC Julian dates	Input to VIIRS Geolocation PGE
United States Naval Observatory UTC Pole Data (no ESDT ShortName)	utcpole.dat Obtained twice a week.	Earth Rotation Wobble - Relates UT1-UTC values to UTC dates.	Input to VIIRS Geolocation PGE
Jet Propulsion Laboratory Planetary Ephemeris Files (no ESDT ShortName)	De200.eos	Planetary ephemeris files from the Jet Propulsion Laboratory (JPL)	Input to VIIRS Geolocation PGE

The parameters contained in the NCEP and NOGAPS files are the same with the exception that the Total Column Ozone is not included in the NOGAPS file. Since NPPDAPS will be getting ancillary data from NOAA NESDIS Central, the NOGAPS PGE will not be run unless there are requirements from NESDIS Central to process the NOGAPS data when a 6-hour NCEP file is missing.

The Land PEATE Integration Team is currently producing the NCEP ancillary data parameters from the NCEP GDAS_0ZF files that are used in data MODIS processing. Most of these parameters are output in the form, dimensions, and units that they appear in the input NCEP file. However, the u and v components of wind are converted by PGE350 to wind direction and speed that are expected in the current

versions of the PGEs. In addition, some parameter profiles at a set of conventional pressure levels are computed by PGE350 for input to several of the current versions of the PGEs. Only the parameters that are required for the current VIIRS PGEs are being output as single parameter files. Table 3-11 lists these parameters by their internal NCEP parameter names along with NCEP's brief description of the products and measurement units. The last two columns list the corresponding ShortNames and LongNames of the parameters that are being output for the current VIIRS PGEs.

Table 3-11 Parameters Available in NCEP GDAS_0ZF Product

NCEP Parameter	NCEP Parameter Description	Units	Land PEATE ShortName	Land PEATE LongName
4LFTX	Best (layer) Lifted Index	K		
5WAVA	5-wave Geopotential Height Anomaly	gpm		
5VAVH	5-wave Geopotential Height	gpm		
ABSV	Absolute Vorticity	/s		
CAPE	Corrective Available Potential Energy	J/kg		
CIN	Convective Inhibition	J/kg		
CLWMR	Cloud Water	Kg/kg		
CWAT	Cloud Water	Kg/m2		
GPA	Geopotential Height Anomaly	gpm		
HGT	Geopotential Height Levels	gpm	NCEP HGHTIP L2 NCEP_GHPIP_L2	NCEP Geopotential Surface Height 5-Min L2 Swath IP 750m Granulation NCEP Geopotential Height Profile 5-Min L2 Swath IP 750m Granulation
HPBL	Planetary Boundary Layer Height	m		
ICEC	Ice Cover (ice = 1, no ice = 0)	Propor-tion		
LAND	Land Cover (land = 1, sea = 0)	Propor-tion		
LFTX	Surface Lifted index	K		
O3MR	Ozone Mixing Ratio	Kg/kg		
POT	Potential Temperature	K		

NCEP Parameter	NCEP Parameter Description	Units	Land PEATE ShortName	Land PEATE LongName
PRES	Pressure	Pa	NCEP PRESIP L2	NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation
PRMSL	Pressure Reduced to MSL	Pa		
PWAT	Precipitable Water	Kg/m2	NCEP PRWIP L2	NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation
RH	Relative Humidity Levels (Use RH and TMP to make Atmospheric Moisture Profiles)	%	NCEP AMPIP L2	NCEP Atmospheric Moisture Profile 5-Min L2 Swath IP 750m Granulation
SOILW	Volumetric Soil Moisture Content	fraction		
SPFH	Specific Humidity	Kg/kg		
TCDC	Total Cloud Cover	%		
TMP	Temperature Levels (Use to make Surface Air Temperature, Atmospheric Temperature & Moisture Profiles)	K	NCEP AIRTIP L2 NCEP_ATPIP_L2	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation NCEP Atmospheric Temperature Profile 5-Min L2 Swath IP 750m Granulation
TOZNE	Total Ozone	Dobson	NCEP COZIP L2	NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation
UGRD	U-component of Wind (Use U & V components together)	m/s	NCEP WDIRIP L2 NCEP_WSPDIP_L2	NCEP Surface Wind Direction 5-Min L2 Swath IP 750m Granulation NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation
VGRD	V-component of Wind(use U & V components together)	m/s	Use Wind V-component & Wind U-component above to make Wind Direction and Speed	Use Wind V-component & Wind U-component above to make Wind Direction and Speed
VVEL	Vertical Velocity (pressure)	Pa/s		
VWSH	Vertical Speed Sheer	1/s		
WEASD	Water Equivalent of Accumulated Snow Depth	kg/m2		

3.8.7VIIRS Operational Data Production

The VIIRS Operational Data Production in NPPDAPS will be run in a similar manner to the MODIS Science Tests. The VIIRS Land Science Team will deliver enhanced algorithms to the Land PEATE in the form of science code modified from the current IDPS Operational Code and request that Science Tests be run on using their enhanced science code to produce products that they can compare to products generated from the IDPS Operational Code. The enhanced code from the Science Team will be referenced in the Land PEATE as the Science Team Code. The Land PEATE will provide the same support to NICSE for calibration improvements as will be provided to the Science Team. In this section of the document NICSE will be considered as part of the Science Team.

The Land PEATE with the support of its Integration Team will determine the PGEs that need to be run to generate the requested science products. Chains of PGEs for time periods that are selected by an agreement between the VIIRS Land Science Team and the Land PEATE will then be run using the NPPDAPS recipes. After the Integration Team completes the integration of the enhanced code into new versions of PGES and recipes, the NPPDAPS Production Manager assigns a unique test number, equivalent to the archive set number, to the Science Test and then plans for running each recipe included in this Science Test in the proper sequence to produce all requested VIIRS products for the selected time period.

There are basically two methods that the Land PEATE will use to support the Science Team in determining if their new version of the algorithm is better than the current IDPS Operational Code. The first method consists of obtaining, integrating, and running the Operational Code in parallel with the enhanced Science Team Code. The second method consists of obtaining the relevant operational data from IDPS to compare to the data to be generated by the Science Team Code.

For the first method, NPPDAPS Operations Personnel start the Recipes containing the IDPS Operational Code for each algorithm that has been modified to run under the NPPDAPS Operational System and the corresponding Recipes containing the enhanced Science Team Code for each science algorithm. The chains of PGES are discussed in further detail in Section 4 of this document. If both IDPS Operational Code and enhanced Science Team Code run correctly, the Land PEATE analysts support the Science Team in comparing the output data products. If there are differences, the Science Team, with support from the Land PEATE analysts, determines which

algorithm is better. Many Science Test runs may be required for the determination.

For the second method the SDRs, EDRs, and IPs made by IDPS from the Operational Algorithm Code can be ordered from SD3E and/or ADS for the requested time period of the Science Tests. The Science Team Code is integrated and run as in the first method. The Land PEATE supports the Science Team in comparing the IDPS generated products to the corresponding products made from the enhanced Science Team Code.

If the Science Team decides that the enhanced algorithm is better, the Land PEATE then sends recommendations to the PSOE and submits the enhanced Science Team Code for inclusion in the CCB. The details for the work performed by the Land PEATE analysts and Science Team are contained in other documents. The PSOE may then recommend that the enhanced Science Team Code be sent to CasaNOSA for IDPS I&T and if approved, integrated into IDPS Operations.

3.8.8NPPDAPS Export

NPPDAPS PGE scripts indicate which data are to be archived and which data are to be exported. The NPPDAPS Operational System archives the VIIRS science data products, including SDRs, EDRs, and IPs, on disks at NPPDAPS reserved for VIIRS data. NPPDAPS exports data to a private site in the NPP version of the MODIS Level 1 and Atmosphere Archive and Distribution System (NPP-LAADS) FTP site for use by the Land PEATE members, the VIIRS Science Team members, NICSE, and Land Operational Product Evaluation (LDOPE). The VIIRS Science Team members may place standing orders with NPPDAPS to receive products. There will also be a web interface to the data on LAADS for these groups.

3.9 Land PEATE Diagnostic Data Record Processing

The Land PEATE is developing chains of PGEs to process the Diagnostic Data Records (DDRs). The individual PGEs are based on the corresponding PGEs in the MODIS data processing. The first chain performs the L2G processing that will enable the generation of the L3 gridded, tiled products. This chain starts with generation of the geolocation pointers and geolocation angles that are used in making the L2G Land products, Table 3-12 lists the PGEs with the ESDT ShortNames and LongNames for their products.

Table 3-12 Land PEATE ESDT ShortNames, ESDT LongNames, and Generating PGEs for Diagnostic Data Record Chains

Generating PGE Name/Description	Product ESDT ShortName	Product ESDT LongName
PGE342 VIIRS L2G DDR Observation Pointers and Geolocation Angles	NPP DPT1KD L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km SIN Grid Day
	NPP DPT1KN L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km SIN Grid Night
	NPP DPTHKD L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m SIN Grid Day
	NPP DGA1KD L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km SIN Grid Day
	NPP DGAHKD L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 500m SIN Grid Day
	NPP DGA1KN L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km SIN Grid Night
	NPP DPT1PD L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km EASE Grid Day
	NPP DPT1PN L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km EASE Grid Night
	NPP DPTHPD L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m EASE Grid Day
	NPP DPTHPN L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m EASE Grid Night
	NPP DGA1PD L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km EASE Grid Day
	NPP DGA1PN L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km EASE Grid Night
	NPP DGAHPD L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 500m EASE Grid Day
	NPP DGAHPN L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 500m EASE Grid Night
PGE343 VIIRS L2G DDR Land Surface Reflectance, Fire Mask, Land Surface Temperature, and Vegetation Index	NPP DSRF1KD L2GD	VIIRS/NPP Surface Reflectance Daily L2G Global DDR 1km SIN Grid Day
	NPP DSRFHKD L2GD	VIIRS/NPP Surface Reflectance Daily L2G Global DDR 500m SIN Grid Day
	NPP DVAF1KD L2GD	VIIRS/NPP Fire Mask Daily L2G Global DDR 1km SIN Grid Day
	NPP DVAF1KN L2GD	VIIRS/NPP Fire Mask Daily L2G Global DDR 1km SIN Grid Night
	NPP DLST1KD L2GD	VIIRS/NPP Land Surface Temperature Daily L2G Global DDR 1km SIN Grid Day

Generating PGE Name/Description	Product ESDT ShortName	Product ESDT LongName
	NPP DLST1KN L2GD	VIIRS/NPP Land Surface Temperature Daily L2G Global DDR 1km SIN Grid Night
	NPP DVI1KD L2GD	VIIRS/NPP Vegetation Index Daily L2G Global DDR 1km SIN Grid Day
	NPP DVIHKD L2GD	VIIRS/NPP Vegetation Index Daily L2G Global DDR 500m SIN Grid Day
PGE344 VIIRS L2G DDR Snow Cover	NPP DSCDHKD L2GD	VIIRS/NPP Snow Cover Daily L2G Global DDR 500m SIN Grid Day
PGE345 VIIRS L2G DDR Sea Ice	NPP DSIHKD L2GD	VIIRS/NPP Sea Ice Daily L2G Global DDR 500m EASE Grid Day
	NPP DSIHKN L2GD	VIIRS/NPP Sea Ice Daily L2G Global DDR 500m EASE Grid Night

3.10VIIRS SDR Proxy Data

The Land PEATE is required to develop, generate, and provide test data to the Science Team to test their VIIRS software and help in their evaluation of the Official VIIRS Products from IDPS Operations. The test data are also needed by the Land PEATE for integrating and testing the VIIRS science data processing software obtained from the NGST Science Team, IDPS Operations, and the VIIRS Science Team.

As a start to providing test data, the Land PEATE has adapted SDRGEN, the L1 SDR proxy data generator, for use by the VIIRS Science Team and the Land PEATE itself. The original software was written by Raytheon, but it needed to be tailored to produce useful inputs to the VIIRS PGEs that are being integrated by Land PEATE into NPPDAPS.

SDRGEN puts MODIS Level 1B data into VIIRS data format. The input MODIS data at 1km resolution are converted and output as VIIRS data at 750m resolution. The input MODIS data at 500m are converted and output as VIIRS data at 375m. In the process, it uses MODIS geometry and nearest MODIS band match-up. The output is in HDF-4 which is expected in the VIIRS PGEs run at NPPDAPS. The Land PEATE code also includes spectral transformation from MODIS data into VIIRS data. There are conversion equations for each band. The Land PEATE added the reading of metadata from MODIS files for ingest into NPPDAPS, reading of MODIS L1B dimensions dynamically rather than using hard-coded values, added metadata needed for the VIIRS data products, smoothed the interpolation for 375m data, added the land/sea mask from MODIS data, and added scan mode for day, night, and terminator data.

The Land PEATE reworked SDRGEN to produce proxy VIIRS granules to test the VIIRS Fire Algorithm. This SDRGEN-FIRE is the version that Land PEATE is now using to produce proxy data. Currently the Land PEATE has completed the generation of one day, consisting of 288 five-minute granules, of VIIRS data for the VIIRS Science Team and for use as input to the Level 2 VIIRS PGEs in NPPDAPS.

The Land PEATE not only provides the VIIRS L1 SDRs at 750m and 375m from SDRGEN to the Science Team, but also provides VIIRS L2 EDRs and IPs from running the chains of VIIRS L2 PGEs at NPPDAPS. Land PEATE runs chains of VIIRS PGEs in science tests for the VIIRS Science Team and makes available the VIIRS output data, the VIIRS PGE code, and test results from the chain tests.

4 NPPDAPS OPERATIONAL PGE CHAINS

4.1 Overview of NPPDAPS Operational PGE Chains

The Land PEATE will base the VIIRS data processing on the MODIS operational scenarios using the NPPDAPS Production System. The scenarios group the PGEs logically into chains of PGEs by processing level, temporal coverage of output VIIRS products, similarity of input products, and similarity of types of output products. The chains contain PGEs that make products that are required by the next set of PGEs. For processing in NPPDAPS the PGEs are grouped into Recipes that are planned with updates of data time coverage periods. The updated instances of the recipes are then submitted to the NPPDAPS Production System. The PGE instances do not run until all of the input data are available and staged by the PGE Loaders. Logical chains of PGEs make contain more than one recipe.

4.1.1Prototype Land PEATE Science Code PGE Chain

For the development of the VIIRS data processing system to run under NPPDAPS, the Land PEATE selected several science code PGEs that were available on NEXT or CasaNOSA to make a prototype chain. None of the Operational Code were ready for use by a production system such as NPPDAPS. The end products of these PGEs in the chain are Surface Reflectance and Vegetation Indices. These are two products that are of primary interest to the VIIRS Science Team and to the Land PEATE. The Prototype Land PEATE Science Code PGE Chain for Surface Reflectance and Vegetation Indices is shown in Figure 4-1.

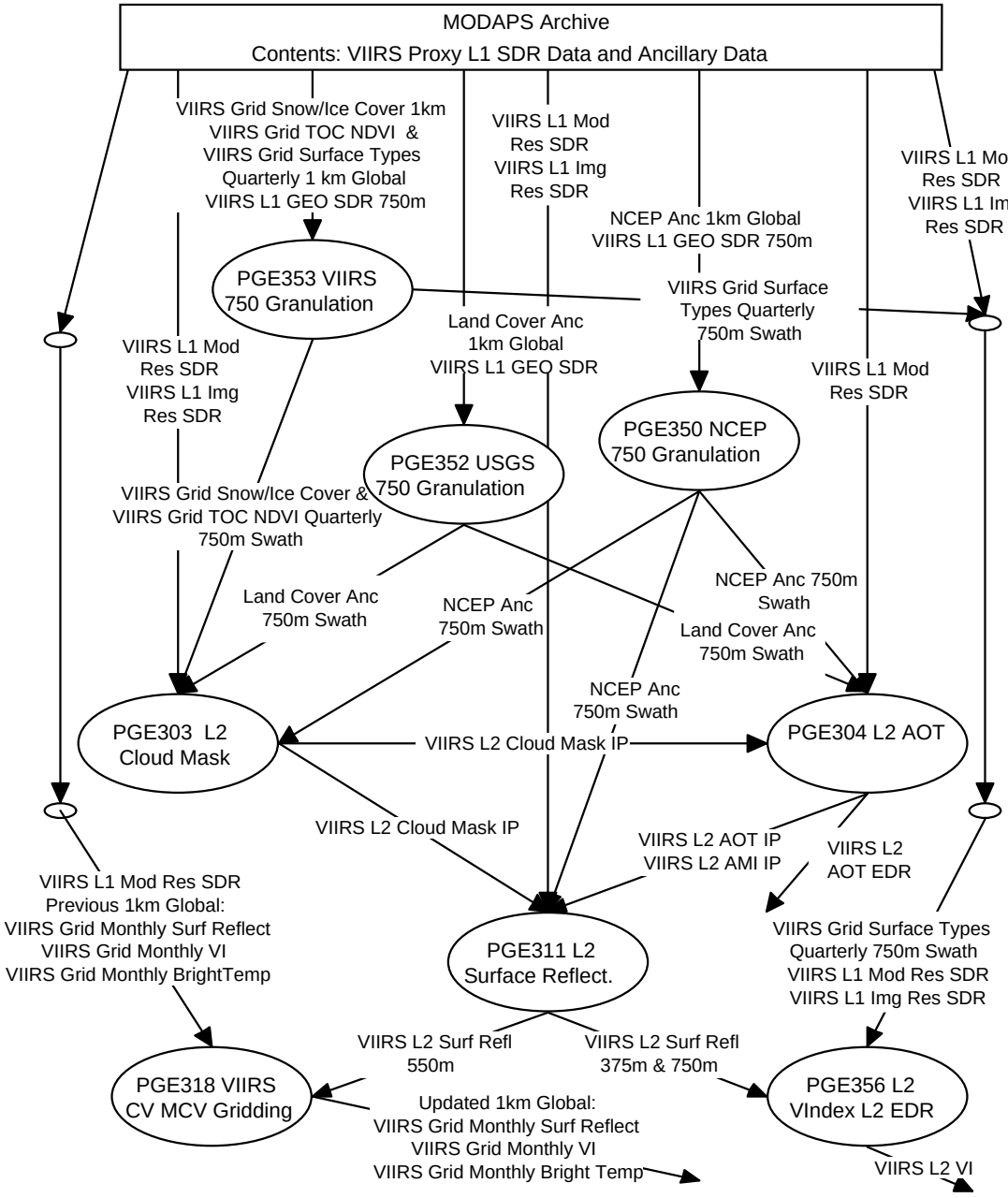


Figure 4-1 Prototype Land PEATE Science Code PGE Chain for Surface Reflectance and Vegetation Indices

The Science Code for the Geolocation and Calibration PGEs was not ready for use, but some Level 1 proxy data had been created for use in PGE integration and test. The L1 proxy data consists of L1 Geolocation files at 375m and 750m resolution and the VIIRS L1 calibrated data sets, the Moderate Resolution at 750m and the Imagery Resolution at 375m.

PGEs for NCEP GFS Granulation, USGS Land Cover Granulation, and VIIRS 750m Granulation were selected to demonstrate the Granulation of data. The geolocation information is contained in the L1 Geolocation IP at 750m Resolution, the L1 Geolocation IP at 375m Resolution, the L1 Moderate Resolution SDR, and the L1 Imagery Resolution SDR. The Granulation PGEs will use either the Geolocation IP or the SDR at the appropriate resolution. The Granulation PGEs for the Prototype Chain extract the swaths at 750m to match the Geolocation files at 750m. PGE303 is run after the Granulation PGEs to make the Cloud Mask that is required for refining the Surface Reflectance product from PGE311. PGE304 is also run using the Cloud Mask input to make the Aerosol Optical Thickness and Aerosol Model Information products needed by PGE311. The Surface Reflectance product is input to PGE356 to make the final Vegetation Index (VI) EDR product that was selected for the Prototype PGE Chain. PGE318 VIIRS Monthly CV MVC Gridding was selected to demonstrate the Gridding of data on a swath basis. However, PGE318 was not integrated for the Prototype Chain Test. The Surface Reflectance created by PGE311 is input to PGE to update the three monthly gridded products at 1km resolution, Surface Reflectance (SR), Vegetation Index (VI), and Brightness Temperature (BT).

4.1.2 Land PEATE Operations Code PGE Chain for L1 and Granulation Products

The first chain to be run in the Launch Ready System for the VIIRS processing is the Land PEATE Operations Code PGE Chain for L1 and Granulation that is shown in Figure 4-2. PGE301 Geolocation is run for every 5-minute VIIRS L0 RDR granule to produce the L1 Geolocation granules at the 375m and & 750m resolution that are needed to make the corresponding calibration data sets. PGE302 Calibration is run next for every set of 5-minute VIIRS L1 Geolocation granules. VIIRS L1 products are made at Imagery Resolution, Moderate Resolution, and for the Day/Night Band. PGE302 also makes the On-Board Calibration (OBC) and Calibrated Dual Gain Band products. All of these products are archived for input to the next chain. The Granulation PGEs could use either the L1 Geolocation IP or the L1 calibrated science data SDR at the appropriate resolution since geolocation information can be found in both. PGE350 requires the NCEP L3 gridded, global GFS Parameters data set and extracts the corresponding L2 swath. PGE351 requires the NAAPS L3 gridded, global total optical depth data set to extract the corresponding L2 swath. PGE352 requires the USGS L3 gridded, global land cover data set to extract the corresponding L2 swath. PGE360 requires the MODIS L3 gridded, global land-water mask to extract the corresponding L2 swath. PGE353 inputs the VIIRS

L3 gridded, global data sets at 750m and 375m to extract corresponding L2 swaths.

4.1.3 Land PEATE Operations Code PGE Chain for L2 Cloud and Active Fires Products

In order to filter out active fire and atmospheric observations that will interfere with the interpretation of the land data, the Land PEATE is running the L2 Active Fires, Cloud Mask, and other atmospheric PGEs in the next chain. The L2 Cloud and Active Fires Chain is shown in Figure 4-3. The VIIRS Atmosphere PEATE will primarily be responsible for the Atmosphere PGEs labeled with an asterisk. PGE330 Active Fires requires the L1 Moderate Resolution 5-minute SDR and a corresponding swath of the VIIRS Gridded Surface Types Quarterly data at 750m resolution which has been made in the first chain. Its Active Fires product is input to PGE303 Cloud Mask. The Cloud Mask also requires L1 5-minute SDRs at both resolutions and the corresponding swaths of Snow/Ice Cover, NBAR NDVI, NCEP GFS Parameters, and MODIS Land-Water Mask at 750m. The L2 Cloud Mask 5-minute granules are input to either to PGE383 Retrieve Aerosol EDRs as described in the EDR-IR or into a sub-chain of separate PGEs and into PGE306 Cloud Optical Properties. The sub-chain consists of PGE304 Aerosol Optical Thickness, PGE381 Aerosol Particle Size, and PGE385 Suspended Matter. These PGEs also require the VIIRS L1 Moderate Resolution SDR swath, the NCEP Parameters swath, and the NAAPS Total Optical Depth swath at 750m. PGE383 makes the L2 Aerosol Optical Thickness, Aerosol Model Information, Aerosol Particle Size, and Suspended Matter products. PGE306 makes the L2 Cloud Optical Properties and the Ice and Night Water Cloud Top Temperature products. All of the 5-minute L2 products are now ready for input the primary L2 Land PGE Chain and the L2 Ice PGE Chain.

4.1.4 Land PEATE Operations Code PGE Chain for L2 Land Products

The primary land product chain shown in Figure 4-4 produces four L2 EDR products that IDPS exports to NESDIS and AFWA for climate modeling and research. The other land products in the chain are L2 IPs. Most of the land products shown in this figure are generated at 750m resolution. The L2 Vegetation Index is generated at 375m resolution. Only the 375m products and the swath products from the granulation PGEs are labeled with the resolution.

PGE311 Surface Reflectance is run after all of the L2 SDRs, NCEP ancillary granulated swaths, L2 Cloud Mask, and L2 Aerosol products are made for the processing period. The

Surface Reflectance PGE inputs L1 SDRs at both 750m and 375m resolutions and the Surface Reflectance product is produced at both resolutions within the output file. These products are input to the downstream L2 Land PGEs on this figure.

PGE307 Snow Cover requires the L1 SDRs at both resolutions, L2 Cloud Mask, L2 Aerosol products, and L2 Cloud Optical Properties. The L2 Snow Cover EDR product is input to the PGEs for Land Albedo and Surface Type.

PGE356 Vegetation Index (VI) requires the L1 SDRs at both resolutions, L2 Surface Reflectance at both resolutions, and VIIRS gridded Surface Types granulated swaths. The L2 VI at 375m is an EDR product.

PGE355 Land Albedo requires the L1 Moderate Resolution SDR, L2 Aerosol products, L2 Snow Cover, L2 Surface Reflectance at 750m, the NCEP ancillary granulated swath, and the VIIRS gridded Land Albedo granulated swath as input. The output is the VIIRS L2 Land Albedo EDR at 750m resolution.

PGE 349 Surface Type requires L2 Cloud Mask, L2 Active Fires, L2 Land Surface Reflectance, L2 Snow Cover, and VIIRS gridded Surface Type and Annual Min/Max Vegetation Index granulated swaths as inputs. The output L2 Surface Type product is input to downstream PGEs, including the Land Surface Temperature PGE on this figure.

PGE316 Land Surface Temperature requires the L1 Moderate Resolution SDR, L2 Cloud Mask, L2 Aerosol Optical Thickness, and L2 Surface Type as inputs. The L2 Land Surface Temperature (LST) product is an EDR at 750m resolution.

4.1.5 Land PEATE Operations Code PGE Chain for L2 Ice Products

The Ice Chain shown in Figure 4-5 produces two EDR products that IDPS exports to NESDIS and AFWA for climate modeling and research. Most products shown on the Ice Chain figure are generated at 375m resolution. Only the 750m products and the swath products from the granulation PGEs are labeled with the resolution.

PGE370 Ice Quality requires L1 Imagery Resolution SDR, L2 Cloud Mask, L2 Aerosol Optical Thickness, and L2 Cloud Optical properties as input. Its products of L2 Ice Quality and Ice Weights at 375m resolution are needed by many of the Ice PGEs shown in the figure.

PGE371 Ice Surface Temperature produces products at 375m resolution. It is named Surface Temperature in the EDRIR to distinguish it from the corresponding Ice Surface

Temperature PGE that makes the EDR product at 750m. PGE371 requires L1 Imagery and Moderate Resolution SDRs, L2 Aerosol Optical Thickness, L2 Ice Weights, and L2 Ice Quality. The product is L2 Surface Temperature at 375m resolution.

PGE374 Ice Concentration requires L1 Imagery Resolution SDR, L2 Ice Surface Temperature at 375m, L2 Ice Quality, and L2 Ice Weights. The output products are L2 Ice Concentration, L2 Ice Reflectance/Temperature.

PGE373 Ice Surface Temperature requires L1 Moderate Resolution SDR, L2 Cloud Mask, L2 Aerosol Optical Thickness, and L2 Ice Concentration. The outputs product is L2 Ice Surface Temperature EDR at 750m resolution.

PGE308 Sea Ice Characterization/ Ice Age requires L2 Aerosol Optical Thickness, L2 Aerosol Model Information, NCEP and NAAPS Ancillary swaths granulated to 750m, a VIIRS Gridded Previous Ice Age swath granulated to 375m, and many L2 Ice products. The Ice inputs are Quality, Weights, Concentration, and Reflectance/Temperature. The outputs are the Sea Ice Characterization/Ice Age EDR at 375m and the Ice Albedo IP at 375m.

4.1.6Land PEATE Operations Code for 5-Minute Gridding

The Land PEATE will run the 5-minute, continuous gridding PGEs after the 5-minute L2 required input products are generated to update the VIIRS gridded global data sets at 1 km resolution. The gridded global files must be updated before the next pass of the satellite over any part of the swath covered by the current L2 granules. The granulation PGEs must be run to extract the swaths from the updated gridded global files that are required as input to the L2 PGEs. These gridding PGEs are shown in Figure 4-6.

PGE 314 inputs the L1 Geolocation, L2 Snow Cover, and L2 Ice Concentration granules to update the VIIRS Gridded Snow/Ice Cover file. PGE 315 inputs the L1 Geolocation and L2 Sea Ice Characterization/Ice Age granules to update the VIIRS Gridded Previous Ice Age file. PGE 317 inputs the L1 Geolocation and L2 Land Surface Reflectance granules to update the VIIRS Gridded 17_Day NBAR/NDVI file. At NPPDAPS these PGEs will be run on an orbital basis since the swath is not observed again until the next orbit. PGE318 inputs the L1 Geolocation, L1 Moderate Resolution SDR, and L2 Land Surface Reflectance granules to update the gridded monthly VIIRS data set. At NPPDAPS PGE318 will be run daily since no granulation swaths from this data set are needed by the L2 PGEs. The monthly data set contains Brightness Temperature (BT), Surface Reflectance (SR), and Vegetation Index (VI).

4.1.7Land PEATE Operations Code for Daily and Multi-Day Gridding

The Land PEATE will run several daily and multi-day gridding PGEs that are supplied by the VIIRS Science Team to NGST for inclusion in the Operations Code. The VIIRS Land Science Team and Land PEATE also plan to develop similar gridding PGEs for diagnostics and trend analysis to match the MODIS products. The Operations daily and multi-day PGEs are shown in Figure 4-7. PGE313 inputs all of the L1 Geolocation and L2 Land Surface Reflectance granules each day to make the VIIRS Gridded Surface Reflectance Daily product at 1km resolution. PGE319 inputs 17 days of the VIIRS Gridded Surface Reflectance Daily product to make the VIIRS Gridded Land Albedo 17-Day and VIIRS Gridded BRDF Archetypal 17-Day products. PGE341 inputs consecutive 3 months of VIIRS Gridded Monthly Brightness Temperature, Surface Reflectance, and VI to make the VIIRS Gridded Quarterly Surface Type and VIIRS Gridded Quarterly Annual Min/Max VI products.

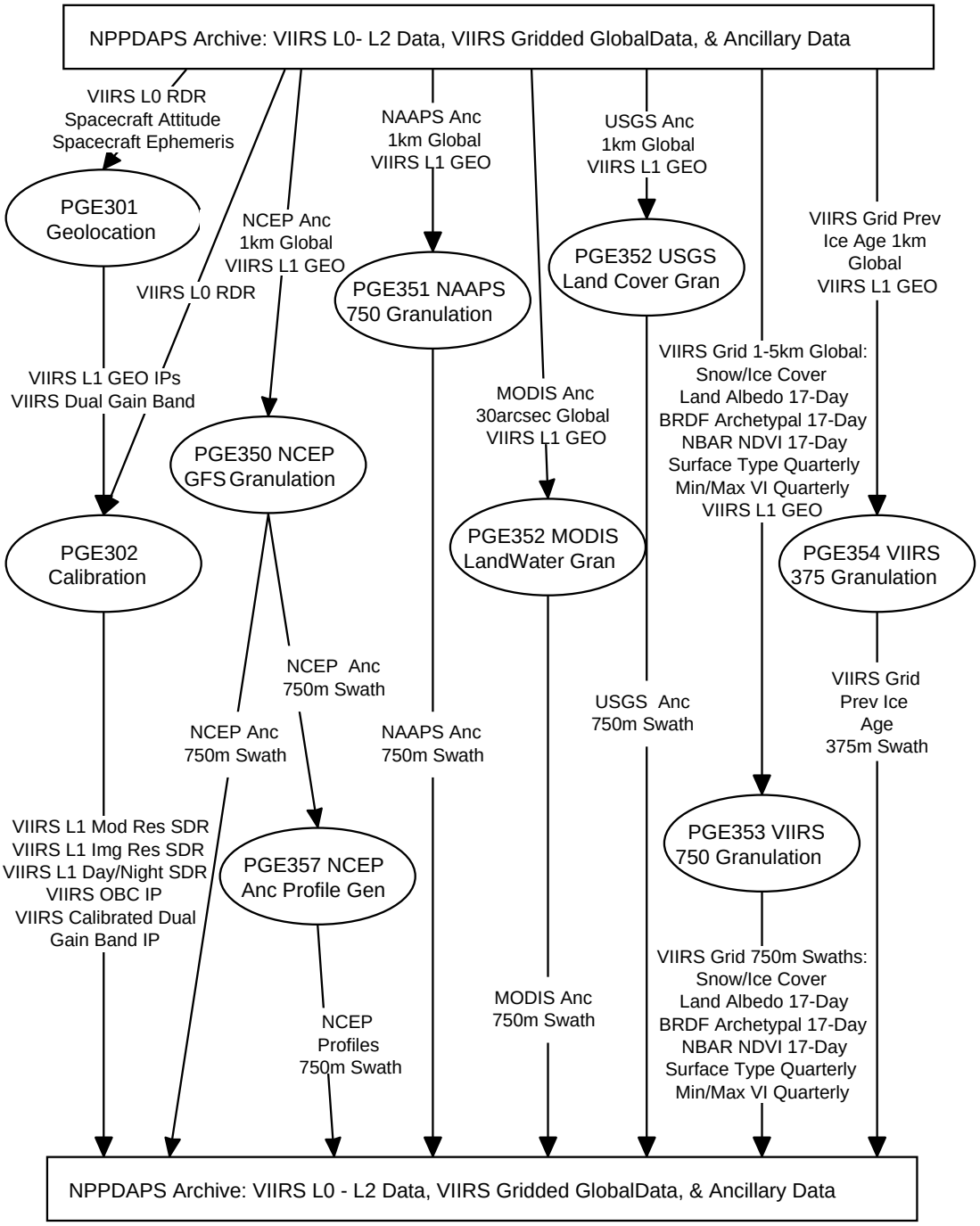
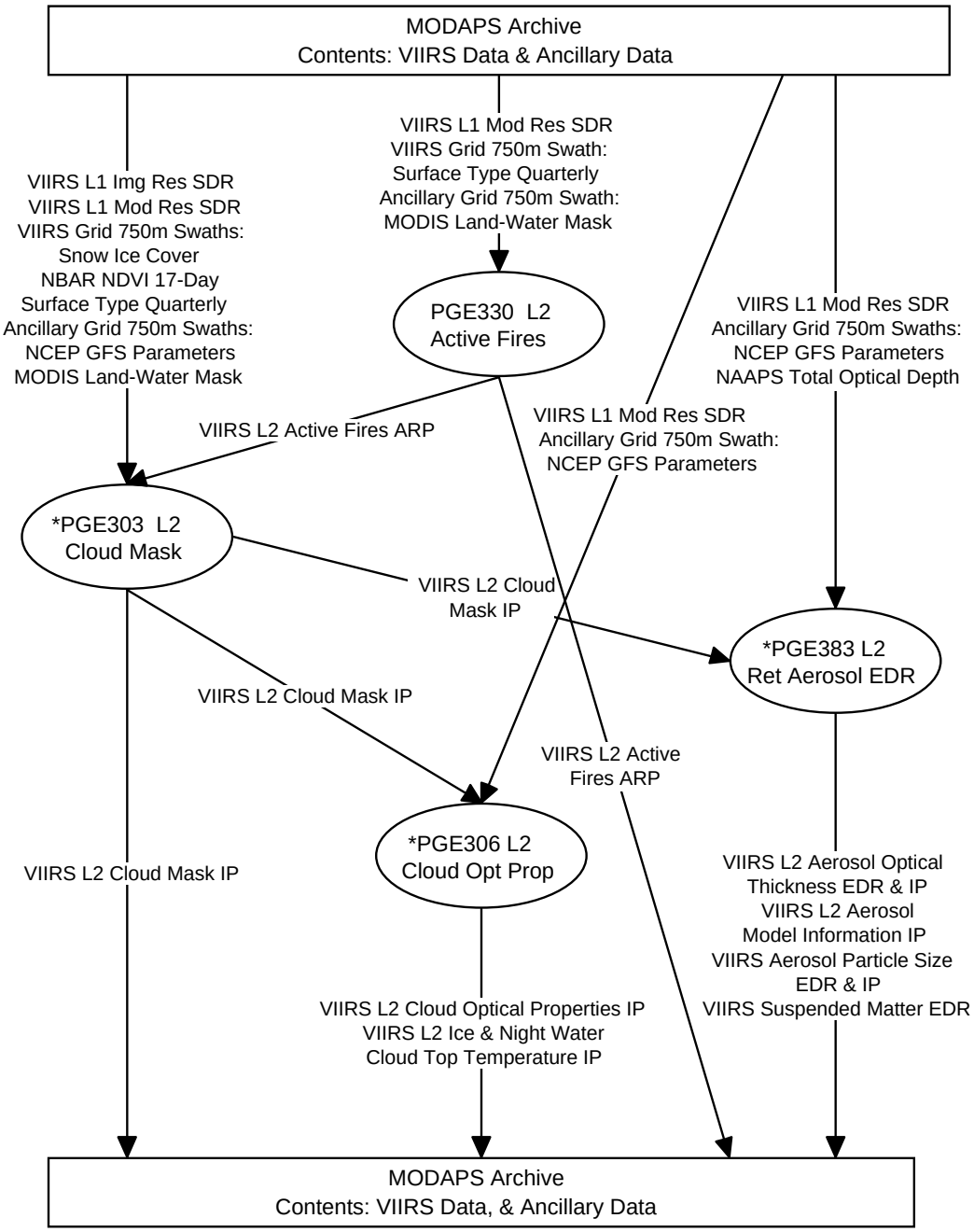


Figure 4-2 Land PEATE Operations Code PGE Chain for L1 and Granulation



* The Atmosphere PEATE is primarily responsible for this PGE.

Figure 4-3 Land PEATE Operations Code PGE Chain for L2 Cloud and Active Fires

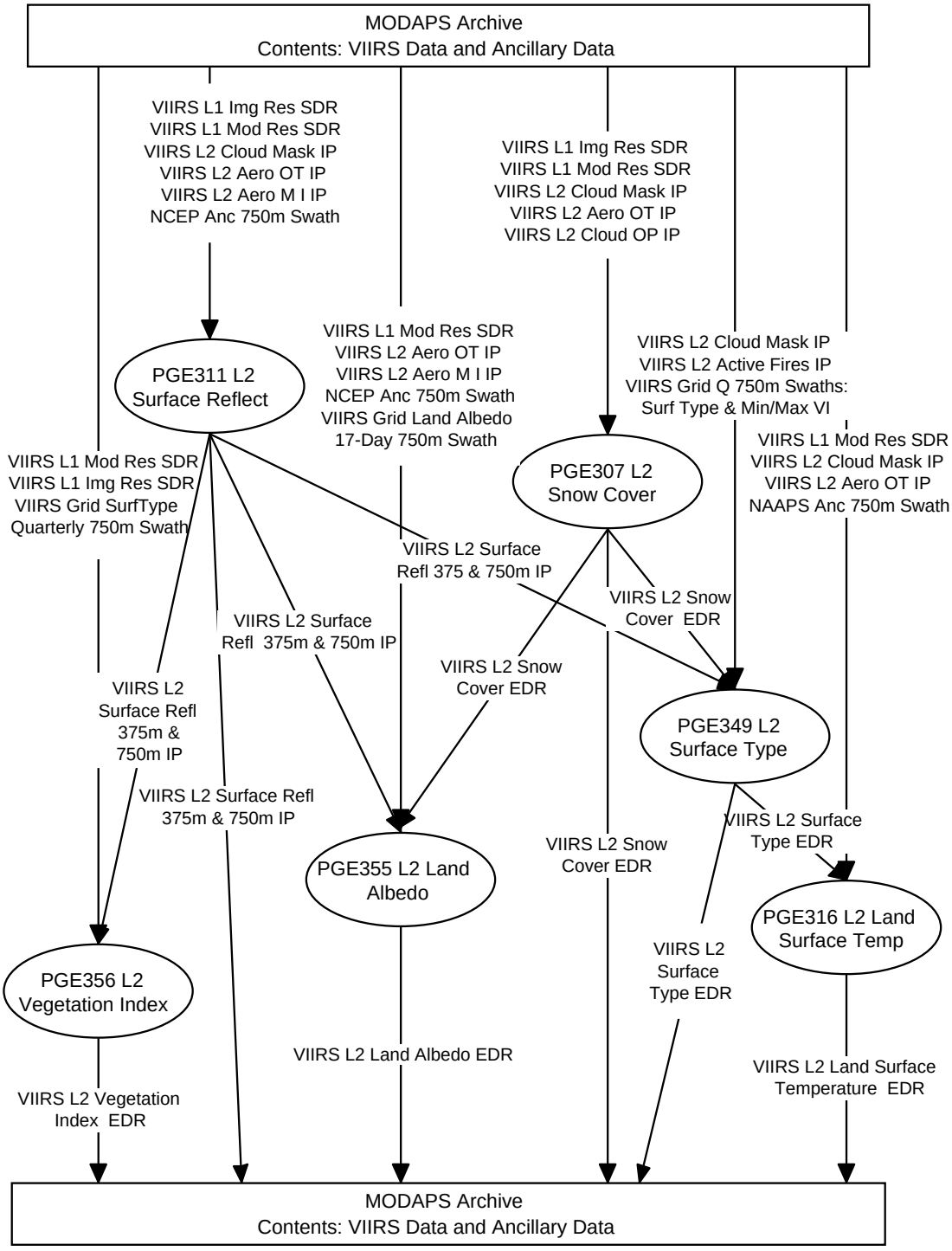


Figure 4-4 Land PEATE Operations Code PGE Chain for L2 Land

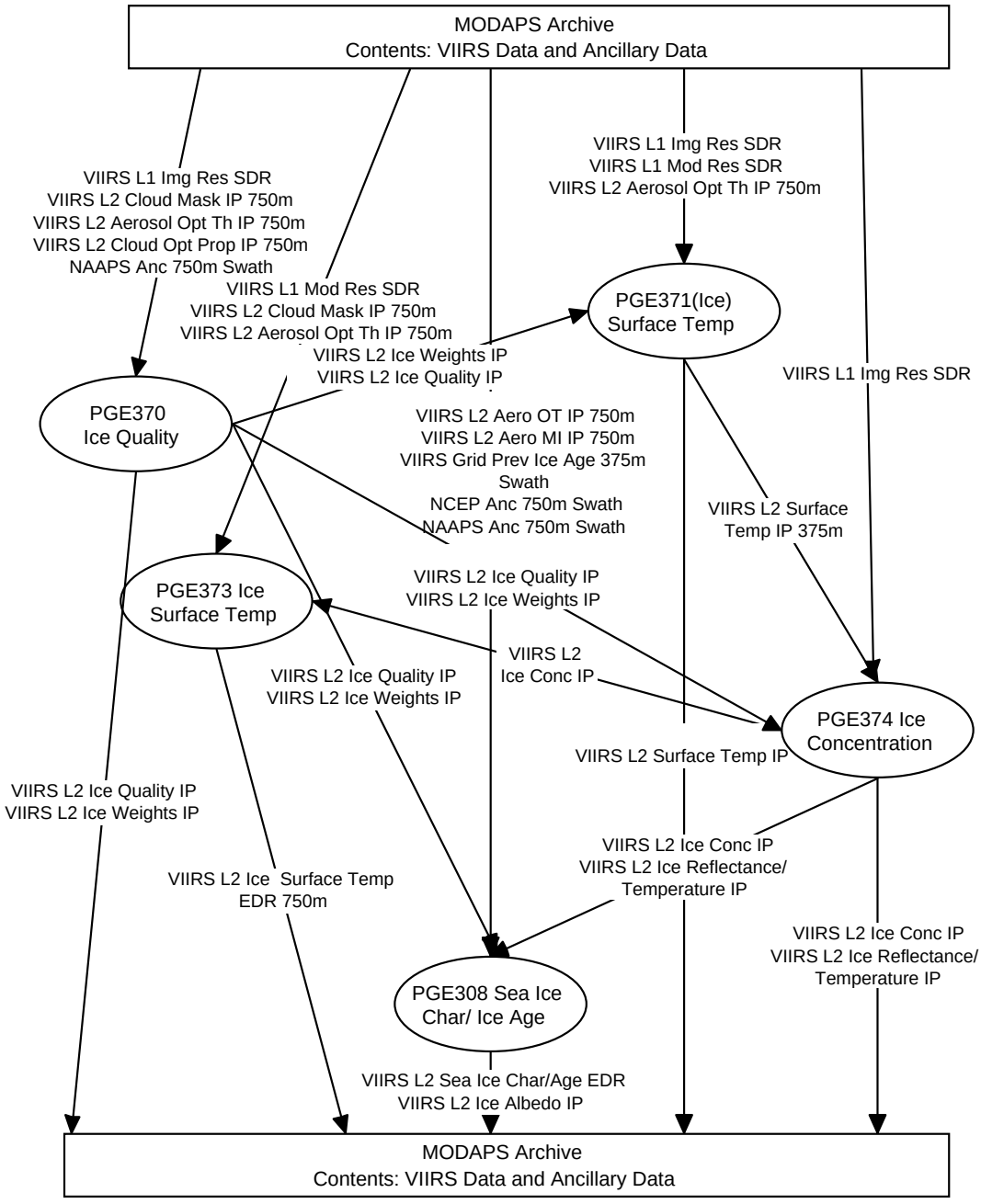


Figure 4-5 Land PEATE Operations Code PGE Chain for L2 Ice

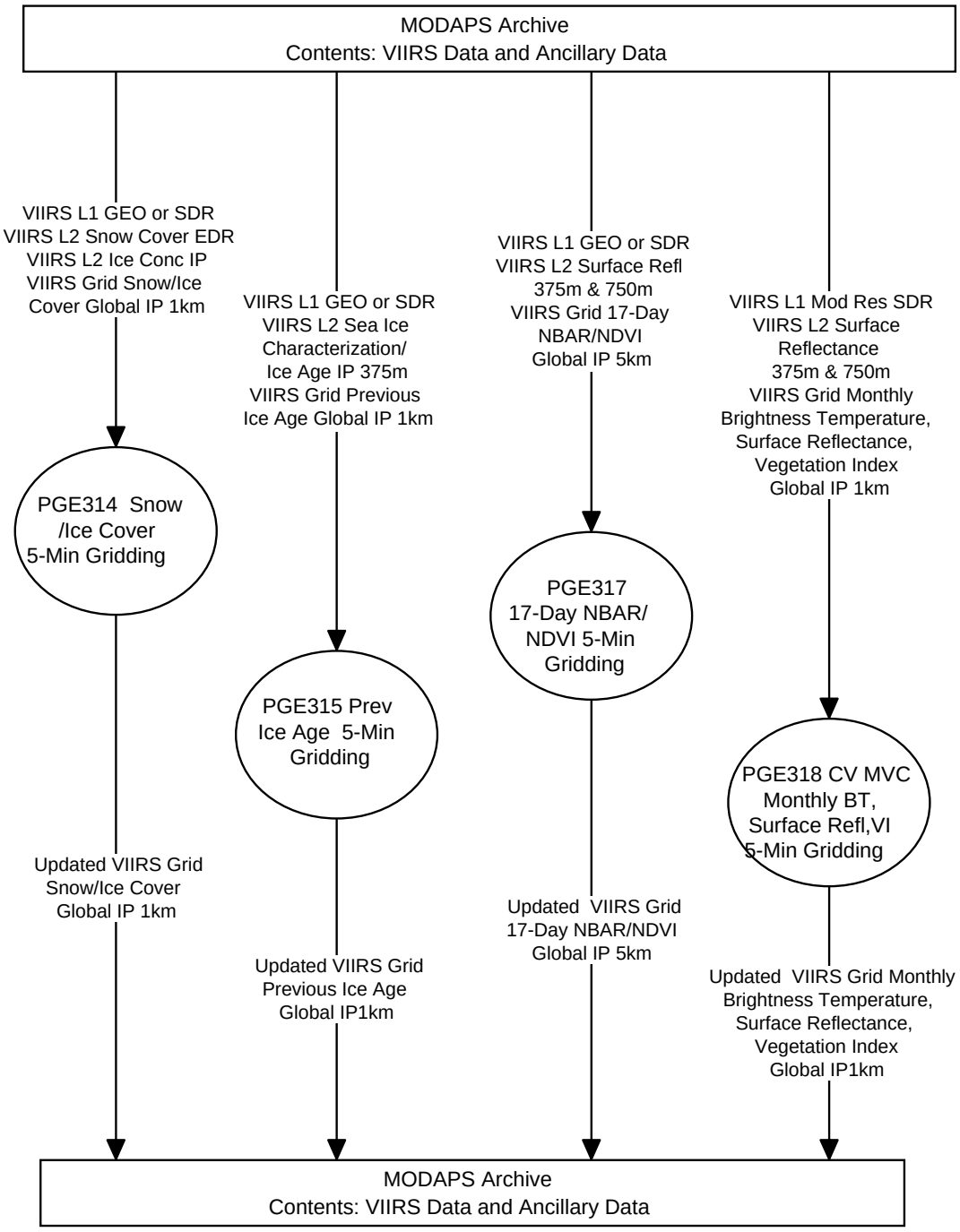


Figure 4-6 Land PEATE Operations Code PGE Chain for 5-Minute Gridding

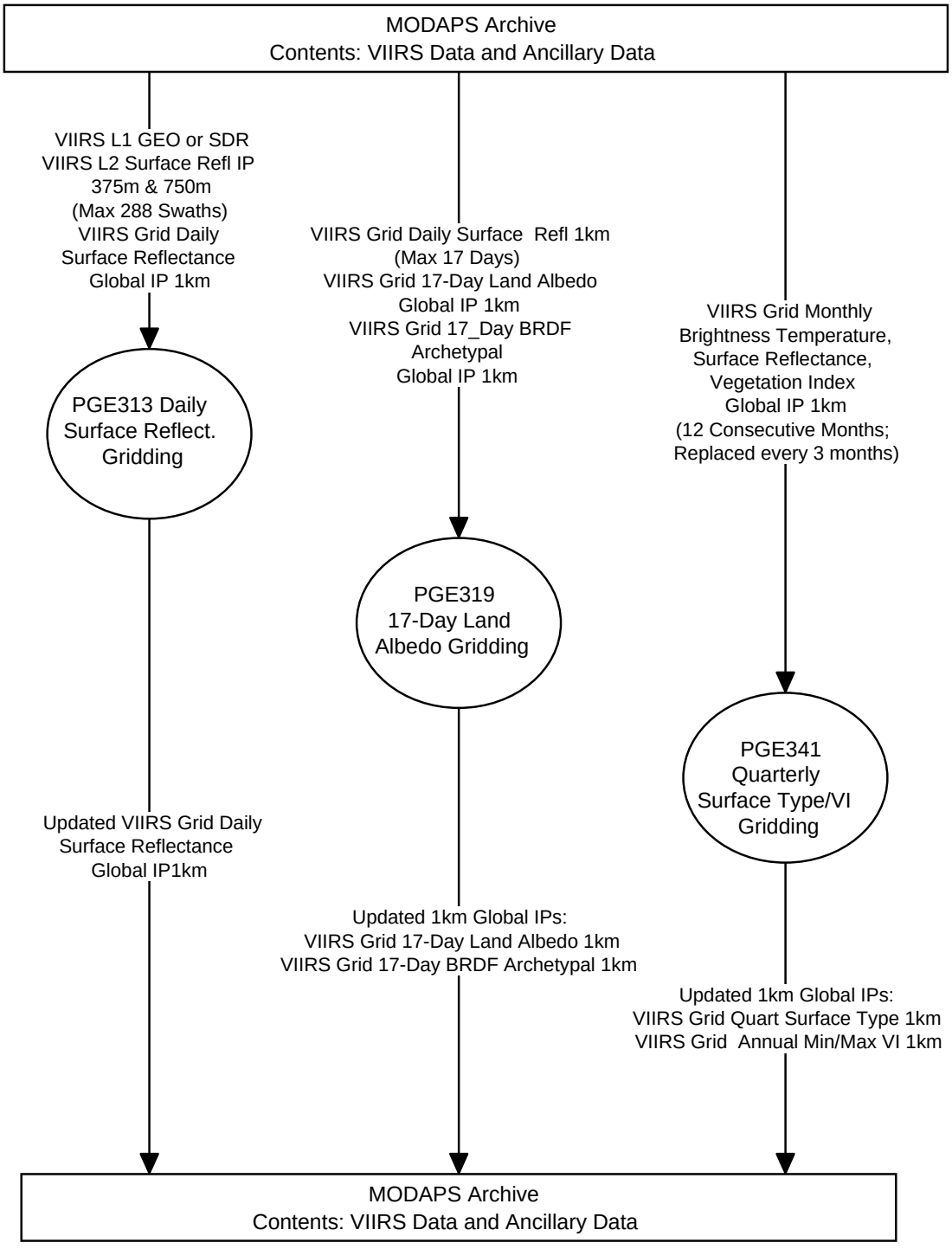


Figure 4-7 Land PEATE Operations Code PGE Chain for Daily and Multi-Day Gridding

4.2 Scope of PGE Descriptions for System Description Version 1.2

Section 5 describes all of the Launch-Ready L2 Science PGEs that the Land PEATE plans to run to support the VIIRS Science Team and the relevant gridding/granulation PGEs that are described in the EDR Interdependency Report (EDR-IR). All of the PGEs shown on the Science Code Prototype System in Figure 4-1 have been integrated and successfully run in a chain test at NPPDAPS. The final Operations Code is expected to be in accord with the EDRIR. However, the 2007 version of most of the Operations Land and Atmosphere PGEs had some differences from the expected code described in the EDR-IR. These PGEs have been integrated into NPPDAPS. Differences in the Operations Code as expected in the EDR-IR and both the Science Code that was integrated for the Prototype System and the Operations Code that was received in 2007 are documented in the tables and text descriptions.

5 INDIVIDUAL OPERATIONAL PGE DESCRIPTIONS

5.1 VIIRS L1 Geolocation (PGE301)

5.1.1 PGE Purpose and Description

PGE301 computes the Earth location and related spatial information for the three groups of VIIRS raw science data Bands; the 375m Imagery Resolution Bands, the 750m Moderate Resolution Bands, and the 375m Day/Night Band. It also produces the Dual Gain Band. Separate output files are produced for all of these products with and without the terrain correction. The Earth location contents include geodetic latitude, longitude, and height.

5.1.2 Production Rules for NPPDAPS

The VIIRS Geolocation PGE is run every 5 minutes after the VIIRS Decompressed Raw Instrument Packets L0 RDR containing the raw instrument data for this time period is ingested at NPPDAPS from IDPS. PGE301 requires the previous, current, and subsequent five minutes of the VIIRS Instrument RDRs as input. The spacecraft attitude and ephemeris information corresponding to this entire period must also be input to the PGE. The Geolocation files for each of the groups of VIIRS Bands with and without the terrain correction are output in corresponding 5-minute products.

NPPDAPS Production Analysts will plan the L1 Recipe for the PGE301 Geolocation and subsequent PGE302 Calibration 5-minute runs for a time period corresponding to the expected length of the VIIRS L0 Decompressed Raw Instrument Packets L0 RDR from IDPS. The external ancillary input files and static input files must already be installed at NPPDAPS before PGE301 is executed. When the L0 file arrives and is ingested, the plan will be submitted to the NPPDAPS Production System. The NPPDAPS Loaders stage the input L0 data for the PGEs in the L1 Recipe. As the products are generated by the PGE runs, they are archived at NPPDAPS for use in the L1 Calibration PGE and the L2 PGEs.

Since the VIIRS L0 input product is a 5-minute data granule that matches the time period of the output L1 Geolocation product and the previous, current, and subsequent 5-minute RDR granules are required for processing, the Basic Temporal and Advanced Temporal Production Rules are required at NPPDAPS for PGE301.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.1.3 VIIRS Input Products

Previous, current, and subsequent 5 minutes of all input data below.

NPP_RVIRS_L0	VIIRS/NPP Decompressed Raw Instrument Science Packets 5-Min L0 RDR
NPP_VIRTE_L0	NPP Spacecraft Ephemeris RDR
NPP_VIRTA_L0	NPP Spacecraft Attitude RDR

5.1.4 External Ancillary Input Products

leapsec.dat	US Naval Observatory Leap Seconds file
utcpole.dat	US Naval Observatory Earth Rotation file
de200.eos	JPL Planetary Ephemeris file

5.1.5 Static Data Inputs

Digital Elevation Model (DEM) files

5.1.6 VIIRS Output Products

NPP_IMFT_L1	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_DNFT_L1	VIIRS/NPP Day/Night Band Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_UDGTGIP_L1	VIIRS/NPP Unaggregated Dual Gain Band Terrain Corrected Geolocation 5-Min L1 Swath IP

5.1.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, …}.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.2 VIIRS L1 Calibration (PGE302)

5.2.1 PGE Purpose and Description

The VIIRS Level 1 Calibration PGE302 converts the L1 VIIRS raw instrument packets into calibrated reflectances, radiances, and brightness temperatures at the Imagery and Moderate Resolutions. There are three VIIRS science SDR products. The Imagery Resolution SDR contains the calibrated reflective and emissive data at 375m for Bands I1 through I5. The Moderate Resolution SDR contains the reflective and emissive data at 750m for Bands M1 through Band 16. The Day-Night (DNB) SDR contains the reflective data at 375m for the DNB Band. All of these SDRs contain the geolocation, terrain height, solar zenith angles, sensor zenith angles, solar azimuth angles, and sensor azimuth angles for every pixel in the SDR. In addition the DNB SDR contains the lunar zenith angle, the lunar azimuth angle, and the lunar phase. PGE302 also makes the Onboard Calibrator product and the Calibrated Dual Gain Band product.

5.2.2 Production Rules for NPPDAPS

The VIIRS Calibration PGE is run every 5 minutes after the Geolocation files for that 5-minute period have been produced. The L1 Calibration SDRs are output in corresponding 5-minute products.

NPPDAPS Production Analysts will plan the L1 Recipe for the PGE301 Geolocation and subsequent PGE302 Calibration 5-minute runs for a time period corresponding to the expected length of the VIIRS L0 Decompressed Raw Instrument Packets L0 RDR from IDPS. PGE302 requires the previous, current, and subsequent five minutes of the VIIRS Instrument RDRs with associated geolocation, whether in separate files or included in the RDRs. The static input files must already be installed at NPPDAPS before PGE302 is executed. When the L0 file arrives and is ingested, the plan will be submitted to the NPPDAPS Production System. The NPPDAPS Loaders stage the input L0 data for the PGEs in the L1 Recipe. As the products are generated by the PGE runs, they are archived at NPPDAPS for use in the L2 PGEs.

Since the VIIRS L0 input and the L1 Geolocation input products are 5-minute data granules that match the time period of the output L1 Calibration products and the previous, current, and subsequent 5-minute RDR and Geolocation granules are required for processing, the Basic Temporal and Advanced Temporal Production Rules are required at NPPDAPS for PGE302.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.2.3 VIIRS Input Products
Previous, current, and subsequent 5 minutes of all input data below.

NPP_VIIRS_L0	VIIRS/NPP Decompressed Raw Instrument Packets 5-Min L0 RDR
NPP_IMFT_L1	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_DNFT_L1	VIIRS/NPP Day/Night Band Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_UDGTGIP_L1	VIIRS/NPP Unaggregated Dual Gain Band Terrain Corrected Geolocation 5-Min L1 Swath IP

5.2.4 External Ancillary Input Products

None

5.2.5 Static Data Inputs

Calibration LUTs

5.2.6 VIIRS Output Products

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VDNE_L1	VIIRS/NPP Day/Night Band 5-Min L1 Swath SDR 375m .
NPP_VOBCIP_L1	VIIRS/NPP On Board Calibrator (OBC) IP
NPP_VCDGIP_L1	VIIRS/NPP Calibrated Dual Gain Band IP

5.2.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>

PGEVersion	<Version of PGE that is set in the PGE script.>

5.3 VIIRS L2 Active Fires (PGE330)

5.3.1 PGE Purpose and Description

The Active Fire ARP consists of latitude and longitude sets of pixels in the L2 swath in which active fires are detected. The VIIRS Active Fires Algorithm is an extension of the MODIS algorithm. The algorithm is based on a decision tree using VIIRS M13 and M15 bands. The significant fires are detected using an absolute threshold of band M13. Other fires are determined from context based on statistical comparisons of brightness temperatures with neighboring pixels. Additional tests eliminate accidental flagging as fire pixels. The current 2007 Operational Code outputs the Fire Mask and associated Quality Flags IP. The L2 swath from the Gridded Surface Type Quarterly product is used to determine the presence of water instead of the L2 swath from the Gridded MODIS Land-Water Mask as indicated in the EDR-IR.

5.3.2 Production Rules for NPPDAPS

The Active Fire Algorithm is run at NPPDAPS in PGE330 after the VIIRS L1 Calibration and VIIRS Gridded IP 750m Granulation PGE have been completed for the 5-minute processing period. PGE330 requires the previous, current, and subsequent five minutes of the VIIRS Calibrated Spectra SDRs as inputs. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Moderate Resolution Reflectances

Band M5 Reflectances	Visible
Band M7 Reflectances	Near Infrared
Band M11 Reflectances	Short Wave Infrared

Moderate Resolution Brightness Temperatures

Band M13 Brightness Temperatures	Mid Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle

Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude
Longitude

PGE330 is run every 5 minutes. The input products to PGE330 are all in swath format with coordinates that determine the coordinates of the output Active Fires swath product. Since the previous, current, and subsequent 5-minute SDR granules are required for processing, the Basic Temporal and Advanced Temporal Production Rules are required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE330 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.3.3 VIIRS Input Products

Previous, current, and subsequent 5 minutes of all input data below.

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m (previous, current, and subsequent)
NPP_QSIP_L2	VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation

5.3.4 External Ancillary Input Products

MODIS Data File with Swath at 750m Resolution:

MODIS_LWMIP_L2	MODIS Gridded Land-Water Mask 5-Min L2 Swath IP 750m Granulation (Not used in 2007 OPS Code; water scenes are determined by surface type in NPP_QSIP_L2.)

5.3.5 Static Data Inputs

VIIRS-AF-CFG_LPEATE
VIIRS-AF-EDR-AC-Int_LPEATE

5.3.6 VIIRS Output Products

NPP_AVAF_L2	VIIRS/NPP Active Fires 5-Min L2 Swath ARP 750m (Not output in 2007 OPS Code.)

NPP_VAFIP_L2	VIIRS.NPP Fire Mask & Quality Flags 5-Min L2 Swath IP 750m (Output from 2007 OPS Code; not in EDR-IR.)

5.3.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as "IRIX64 modular 6.5 011 001245 IP27".>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.4 VIIRS L2 Cloud Mask IP (PGE303)

5.4.1 PGE Purpose and Description

The Cloud Mask IP is an important VIIRS input product for many of the Land algorithms. The purpose of the VIIRS Cloud Mask algorithm is to determine whether each VIIRS pixel is cloudy or clear. If clouds are detected, the algorithm determines whether the cloud phase is water, ice, or a mixture. Other detections include aerosols, fires, shadows, day/night, sun glint, land, water, coast, and snow/ice.

5.4.2 Production Rules for NPPDAPS

The Cloud Mask algorithm is run at NPPDAPS in PGE303 after the Geolocation PGE301, the Calibration PGE302, the VIIRS granulation PGE353 for 750m resolution data, and the ancillary data granulation PGEs for NCEP and USGS data have completed successfully for 5-minute processing period. PGE303 requires the previous, current, and subsequent five minutes of all input data types. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

PGE396 has been run to update previous VIIRS gridded global 1km VIIRS data sets for new swaths covering the area for the current Cloud Mask run. PGE353 extracts a swath granulated to 750m for input to PGE303 and other PGEs. The dynamic ancillary parameters are extracted from the NCEP data set. In NPPDAPS all of the NCEP data parameters required by the VIIRS PGEs are extracted from a single NCEP 6-hour file overlapping the 5-minute period and these parameters are stored into one output NCEP granulation file that matches the geolocation coordinates of the swath in the L1 SDR. In the external ancillary table below, all of the NCEP parameters can be read by a PGE from a single NCEP granulation file. In NPPDAPS all USGS data parameters are also stored into one output USGS granulation file; only one parameter is required by PGE303.

The following SDR bands are used as inputs: (Information derived from the EDR Interdependency Report and source code):

Moderate Resolution Reflectances

Band M1 Reflectances	Visible
Band M4 Reflectances	Visible
Band M5 Reflectances	Visible
Band M7 Reflectances	Near Infrared
Band M8 Reflectances	Short Wave Infrared
Band M9 Reflectances	Short Wave Infrared
Band M10 Reflectances	Short Wave Infrared

Band M11 Reflectances	Short Wave Infrared

Moderate Resolution Brightness Temperatures (0.645, 0.865 µm):

Band M12 Brightness Temperatures	Mid Wave Infrared
Band M13 Brightness Temperatures	Mid Wave Infrared
Band M14 Brightness Temperatures	Long Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Imagery Resolution Reflectances:

Band I1 Reflectances	Visible
Band I2 Reflectances	Near Infrared

Imagery Resolution Brightness Temperatures:

Band I4 Brightness Temperatures	Mid Wave Infrared
Band I5 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Terrain Height
Latitude
Longitude

PGE 303 is run every 5 minutes. The input products to PGE303 are all in swath format with coordinates that determine the coordinates of the output Cloud Mask swath product. Since the previous, current, and subsequent 5-minute SDR granules are required for processing, the Basic Temporal and Advance Temporal Production Rules are required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE303 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.4.3 VIIRS Input Products

Previous, current, and subsequent 5 minutes of all input data below.

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VSNICIP_L2	VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation
NPP_VNDVIIP _L2	VIIRS/NPP Gridded Annual NBAR NDVI Quarterly 5-Min L2 Swath IP 750m Granulation
NPP_QSIP_L2	VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation
NPP_AVAF_L2	VIIRS/NPP Active Fires 5-Min L2 Swath ARP 750m (In EDR-IR only.)
NPP_VAFIP_L2	VIIRS/NPP Fire Mask & Quality Flags 5-Min L2 Swath IP 750m (In 2007 OPS Code and SCI Code; not in EDR-IR.)

5.4.4 External Ancillary Input Products

NCEP Data File with Swaths of Parameters at 750m Resolution:

Previous, current, and subsequent 5 minutes of all input data below.

The Current OPS Code and the SCI Code output each NCEP parameter into a separate granulation file. Below are the parameter files needed by the 2007 version of the OPS Code.

NCEP_WSPDIP_L2	NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation
NCEP_AIRTIP_L2	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation
NCEP_PRWIP_L2	NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation

The EDR-IR indicates that the NCEP GFS Granulation parameters will be output into one file. Below is the GFS file with parameters above that are needed by this PGE.

NCEP_GFS_ANC	NCEP Global Forecast System Parameters L2 Swath IP 750m Granulation (Sea Surface Winds (Speed and Direction)) (Surface Air Temperature) (In 2007 OPS Code and EDR-IR; not in SCI Code.) (Total Column Precipitable Water)

MODIS Land-Water Mask with Swath at 750m Resolution:

MODIS_LWMIP_L2	MODIS Land-Water Mask 5-Min L2 Swath 750m Granulation (In EDR-IR; not in 2007 OPS Code.)

USGS Data File with Swaths of Parameters at 750m Resolution:

USGS_ECOS_ANC	USGS GLCC Global Olson Ecosystems L2 Swath 750m Granulation (In SCI Code only.)

5.4.5 Static Data Inputs

vcm.cfg	Cloud Mask Configuration LUT File (In SCI Code only.)

5.4.6 VIIRS Output Products

NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m

5.4.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.5 VIIRS L2 Aerosol Optical Thickness (PGE304)

5.5.1 PGE Purpose and Description

The Aerosol Optical Thickness (AOT) is an important VIIRS input product for many of the Land algorithms. The purpose of the VIIRS AOT algorithm is to retrieve the aerosol optical thickness over both land and ocean for each cloud-free, daytime pixel. Both AOT EDR and IP products are generated. The ocean output will be at the pixel level but the land output requires an aggregation of AOT values and computation of AOT values for a set of horizontal cells. Quality flags are set for each cell and for the ocean pixels.

The AOT Algorithm has been replaced by the Retrieve Aerosol EDRs Algorithm in the new version of the EDRIR. PGE383 contains the new Retrieve Aerosol EDRs Algorithm.

5.5.2 Production Rules for NPPDAPS

The AOT algorithm is run at NPPDAPS in PGE304 after the Geolocation PGE301, the Calibration PGE302, the VIIRS granulation PGE396 for 750m resolution data, the ancillary data granulation PGE for NCEP data, and the Cloud Mask PGE303 have successfully completed for the 5-minute processing period. PGE304 requires the previous, current, and subsequent five minutes of all input data types. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

In NPPDAPS all of the NCEP data parameters required by the VIIRS PGEs are extracted from a single NCEP 6-hour file overlapping the processing period. These parameters are stored into one output NCEP granulation file that can be read by a PGE. The total column ozone from the OMPS granulation data file will not be used until after the NPP Launch.

The following bands in the SDR are used as inputs:

Moderate Resolution Reflectances

Band M1 Reflectances	Visible
Band M2 Reflectances	Visible
Band M3 Reflectances	Visible
Band M4 Reflectances	Visible
Band M5 Reflectances	Visible
Band M6 Reflectances	Near Infrared
Band M7 Reflectances	Near Infrared
Band M8 Reflectances	Short Wave Infrared
Band M9 Reflectances	Short Wave Infrared

Band M10 Reflectances	Short Wave Infrared
Band M11 Reflectances	Short Wave Infrared

Moderate Resolution Brightness Temperatures

Band M12 Brightness Temperatures	Mid Wave Infrared
Band M13 Brightness Temperatures	Mid Wave Infrared
Band M14 Brightness Temperatures	Long Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Terrain Height
Latitude
Longitude

PGE304 is run every 5 minutes. The input products to PGE304 are all in swath format with coordinates that determine the coordinates of the output AOT swath products. Since the previous, current, and subsequent 5-minute grnules are required for processing, the Basic Temporal and Advanced Temporal Production Rules are required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE304 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.5.3 VIIRS Input Products

Previous, current, and subsequent 5 minute granules of all input data below.

NPP_VMAE_L1 VIIRS /NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_CMIP_L2 VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m

5.5.4 External Ancillary Input Products

Previous, current, and subsequent 5 minutes of all input data below.

NCEP Data File with Swaths of Parameters at 750m Resolution:

The Current OPS Code and the SCI Code output each NCEP parameter into a separate granulation file. Below are the parameter files needed by the 2007 version of the OPS Code.

NCEP_WSPDIP_L2	NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation
NCEP_WDIRIP_L2	NCEP Surface Wind Direction 5-Min L2 Swath IP 750m Granulation
NCEP_PRWIP_L2	NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation
NCEP_AIRTIP_L2	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation
NCEP_PRESIP_L2	NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation
NCEP_HGHTIP_L2	NCEP Geopotential Surface Height 5-Min L2 Swath IP 750m Granulation
NCEP_COZIP_L2	NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation

The EDR-IR indicates that the NCEP GFS Granulation parameters will be output into one file. Below is the GFS file with parameters above that are needed by this PGE.

NCEP_GFS_ANC	NCEP Global Forecast System Parameters L2 Swath IP 750m Granulation (Sea Surface Wind Speed) (Surface Wind Direction) (Total Column Precipitable Water) (Surface Air Temperature) (Surface Pressure) (Surface Height) (Total Column Ozone Concentration)

USGS Data File with Swaths of Parameters at 750m Resolution:

USGS_ECOS_ANC	USGS GLCC Global Olson Ecosystems L2 Swath IP 750m Granulation (In SCI Code only.)

OMPS Data File with Swaths of Parameters at 750m Resolution:

OMPS_COZ_ANC	OMPS/NPP Total Column Ozone First Guess 5-Min L2 Swath IP 750m (In EDR-IR only.)
NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation (In EDR-IR only.)

5.5.5 Static Data Inputs

VIIRS-AOT-CLIMO-LUT_LPEATE
VIIRS-AOT-EDR-AC-Int-1.4.0.18_LPEATE
VIIRS-AOT-LUT_LPEATE
VIIRS-AOT-Sunglint-LUT_LPEATE

5.5.6 VIIRS Output Products

NPP_VAOT_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath EDR 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VAMIIP_L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m
NPP_VAQFIP_L2	VIIRS/NPP Aerosol Quality Flags 5-Min L2 Swath IP 750m (Output of 2007 OPS Code and SCI Code; not in EDR-IR.)

5.5.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.6 VIIRS L2 Aerosol Particle Size (PGE381)

5.6.1 PGE Purpose and Description

Aerosol Particle Size is an algorithm that calculates the wavelength exponent in Angstroms for the difference in the natural logarithm of the aerosol optical thickness at two wavelengths divided by the difference in the natural logarithm of the wavelengths. The input to the algorithm is the Aerosol Optical Thickness produced by its VIIRS L2 algorithm.

5.6.2 Production Rules for NPPDAPS

The Aerosol Particle Size algorithm is a cross-granule PGE that is run at NPPDAPS in PGE381 after Aerosol Optical Thickness PGE304 has successfully completed for the previous, current, and subsequent 5-minute processing periods. PGE381 will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

PGE381 is run every 5 minutes. The input product to PGE381 is in swath format with coordinates that determine the coordinates of the output swath products. Since this is a cross-granule PGE with respect to AOT, both the Basic Temporal and Advanced Temporal Production Rules are required at NPPDAPS for the pre-launch version of the PGE. Dynamic Runtime Parameters available for PGE381 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.6.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS/NPP Moderate resolution 5-Min L1 Swath SDR 750m (In 2007 OPS Code.)
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m (Previous, current, and subsequent granule)

5.6.4 External Ancillary Input Products

None

5.6.5 Static Data Inputs

VIIRS-APSP-EDR-AC-Int_LPEATE

5.6.6 VIIRS Output Products

NPP_VAPS_L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath EDR 750m
NPP_VAPSIP_L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath IP 750m

5.6.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.7 VIIRS L2 Suspended Matter (PGE385)

5.7.1 PGE Purpose and Description

The Suspended Matter Algorithm uses the Aerosol Optical Thickness (AOT) inversion produced aerosol model type to determine the type of suspended matter. If this information is not available, the type of suspended matter is determined by a series of tests. Some types included are volcanic ash, smoke, dust, and sea salt.

5.7.2 Production Rules for NPPDAPS

The Suspended algorithm is run at NPPDAPS in PGE385 after Aerosol Optical Thickness PGE304, Aerosol Model Information PGE304, and Aerosol Particle Size PGE381 have successfully completed for the 5-minute processing period. PGE385 will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Moderate Resolution Brightness Temperatures

Band M14 Brightness Temperatures	Long Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Latitude
Longitude

PGE385 is run every 5 minutes. The input products to PGE385 are all in swath format with coordinates that determine the coordinates of the output swath products. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. Dynamic Runtime Parameters available for PGE385 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.7.3 VIIRS Input Products

NPP_VMAE_L1 VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m

NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VAMIIP_L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m
NPP_VAPSIP_L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath IP 750m

5.7.4 External Ancillary Input Products

None

5.7.5 Static Data Inputs

TBD

5.7.6 VIIRS Output Products

NPP_VSUM_L2	VIIRS/NPP Suspended Matter 5-Min L2 Swath EDR 750m

5.7.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.8 VIIRS L2 Retrieve Aerosol EDRs (PGE383)

5.8.1 PGE Purpose and Description

PGE383 is not currently in the Land PEATE processing system. There has been no NPP Project Level decision on whether PGE304, PGE381, and PGE385 will be combined into PGE383.

Retrieve Aerosol EDRs is an algorithm that was added to the EDRIR, Draft 15, June 2006, version. It is a combination of several Atmosphere algorithms described in the previous version of the EDRIR. The EDR parameters to be retrieved are aerosols, suspended matter, ozone total column/profile, precipitation type and rate, pressure profile, and total water content.

The Aerosol Optical Thickness (AOT) is an important VIIRS input product for many of the land product algorithms. The purpose of the VIIRS AOT algorithm is to retrieve the aerosol optical thickness over both land and ocean for each cloud-free, daytime pixel. Both AOT EDR and IP products are generated. The ocean output will be at the pixel level but the land output requires an aggregation of AOT values and computation of AOT values for a set of horizontal cells. Quality flags are set for each cell and for the ocean pixels.

The Suspended Matter Algorithm uses the AOT inversion produced aerosol model type to determine the type of suspended matter. If this information is not available, the type of suspended matter is determined by a series of tests. Some types included are volcanic ash, smoke, dust, and sea salt.

5.8.2 Production Rules for NPPDAPS

PGE383 is a cross-granule processing PGE. It requires the previous, current, and subsequent five minutes of all input data types. The Retrieve Aerosol EDRs algorithm is run at NPPDAPS in PGE383 after Geolocation PGE301, Calibration PGE302, NCEP Global Forecast System 750m Granulation PGE350, and Cloud Mask PGE303 have successfully completed for the three 5-minute processing periods. PGE383 will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. The main output products from each process feed into the next process.

All of the NCEP data parameters required by the VIIRS L2 PGEs are extracted by the NCEP Granulation PGE350 from a single NCEP 6-hour file overlapping the processing period. These parameters are stored into one output NCEP granulation file that can be read by a PGE. The total column ozone from

the OMPS granulation data file will not be used until after the NPP Launch.

The following bands in the SDR are used as inputs:

Moderate Resolution Reflectances

Band M3 Reflectances	Visible
Band M4 Reflectances	Visible
Band M5 Reflectances	Visible
Band M6 Reflectances	Near Infrared
Band M7 Reflectances	Near Infrared
Band M8 Reflectances	Short Wave Infrared
Band M9 Reflectances	Short Wave Infrared
Band M10 Reflectances	Short Wave Infrared
Band M11 Reflectances	Short Wave Infrared

Moderate Resolution Brightness Temperatures

Band M12 Brightness Temperatures	Mid Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude
Longitude

PGE383 is run every 5 minutes. The input products to PGE383 are all in swath format with coordinates that determine the coordinates of the output swath products. Since the previous, current, and subsequent 5-minute granules are required for processing, the Basic Temporal and Advanced Temporal Production Rules are required at NPPDAPS for the pre-launch version of the PGE. Dynamic Runtime Parameters available for PGE383 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.8.3 VIIRS Input Products

Previous, current, and subsequent 5 minutes of all input data below.

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m

5.8.4 External Ancillary Input Products

NCEP Data File with Swaths of Parameters at 750m Resolution:

NCEP_GFSIP_L2	NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation (Sea Surface Winds (Speed and Direction)) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Ozone Concentration) (Total Column Precipitable Water)

* Generation of the Adjusted Surface Pressure may require further processing of the NCEP GFS Parameters output "Surface Pressure" from the granulation process.

OMPS Data File with Swaths of Parameters at 750m Resolution:

OMPS_COZ_ANC	OMPS/NPP Total Column Ozone First Guess 5-Min L2 Swath IP 750m (In EDR-IR only.)

NRL Aerosol Analysis & Prediction System File with Swaths of Parameters at 750m Resolution:

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation (In EDR-IR only.)

5.8.5 Static Data Inputs

Aerosol Optical Coefficient	DetAOT.cfg
Aerosol Model LUTs	Aero_17_model_v5_4_EDR.LUT
LUT Path File	

5.8.6 VIIRS Output Products

NPP_VAOT_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath EDR 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VAMIIP_L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m

NPP_VAPS_L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath EDR 750m
NPP_VAPSIP_L2	VIIRS/NPP Aerosol Particle Size Parameter 5-Min L2 Swath IP 750m
NPP_VSUM_L2	VIIRS/NPP Suspended Matter 5-Min L2 Swath EDR 750m

5.8.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.9 VIIRS L2 Cloud Optical Properties (PGE306)

5.9.1 PGE Purpose and Description

The Cloud Optical Properties Algorithm consists of two retrieval algorithms that run simultaneously to retrieve cloud optical thickness and cloud effective particle size. The algorithms include both solar and infrared retrievals. The cloud top temperatures, except for daytime water clouds, are also retrieved. For water and ice clouds, daytime retrievals are performed by solar algorithms and nighttime retrievals are performed by infrared algorithms.

5.9.2 Production Rules for NPPDAPS

The Cloud Optical Properties algorithm is run at NPPDAPS in PGE306 after the granulation of ancillary data and Cloud Mask (PGE303) have successfully completed for the 5-minute processing period. PGE306 will be run in a Level 2 Recipe that activates the PGE 288 times per day as input files become available.

In NPPDAPS the NCEP data parameters required by the VIIRS PGEs are extracted from a single NCEP 6-hour file overlapping the processing period. These parameters are stored into one output NCEP granulation file that can be read by a PGE. The output of the NCEP granulation must then be processed through the NCEP Ancillary Data Profile Generation PGE to get the profiles and pressure levels required by PGE306.

The following bands in the SDR are used as inputs:

Moderate Resolution Reflectances

Band M5 Reflectances	Visible
Band M8 Reflectances	Short Wave Infrared
Band M10 Reflectances	Short Wave Infrared

Moderate Resolution Brightness Temperatures

Band M12 Brightness Temperatures	Mid Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared

Moderate Resolution Radiances

Band M12 Radiances	Mid Wave Infrared
Band M14 Radiances	Long Wave Infrared
Band M15 Radiances	Long Wave Infrared
Band M16 Radiances	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude
Longitude

PGE306 is run every 5 minutes. The input products to PGE306 are all in swath format with coordinates that determine the coordinates of the output cloud properties, swath products. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE306 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.9.3 VIIRS Input Products

NPP_VMAE_L1 VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_CMIP_L2 VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m

5.9.4 External Ancillary Input Products

NCEP Data File with Swaths of Parameters at 750m Resolution:

NCEP_AMPIP_L2 NCEP Atmospheric Moisture Profile 5-Min L2 Swath IP 750m Granulation
NCEP_ATPIP_L2 NCEP Atmospheric Temperature Profile 5-Min L2 Swath IP 750m Granulation
NCEP_GHPIP_L2 NCEP Geopotential Height Profile 5-Min L2 Swath IP 750m Granulation

5.9.5 Static Data Inputs

Reflectance LUTs of visible and near infrared bands.

VIIRS-COP-IP-AC-Int.1.4.0.4_LPEATE
VIIRS-ICE-Cld-LUT.1.4.0.4.bin_LPEATE
VIIRS-Water-Cld-LUT.1.4.0.4.bin_LPEATE
Viirs-Cop-Transmittance-LUT.1.4.0.4.bin_LPEATE
Viirs-Cop-Surface-LUT.1.4.0.4.bin_LPEATE

5.9.6 VIIRS Output Products

NPP_VCOPIP_L2	VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m
NPP_WCTTIP_L2	VIIRS/NPP Ice & Night Water Cloud Top Temperature 5-Min L2 Swath IP 750m

5.9.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as "IRIX64 modular 6.5 011 001245 IP27".>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.10VIIRS L2 Land Surface Reflectance (PGE311)

5.10.1 PGE Purpose and Description

The Surface Reflectance products is required by many other Land PEATE PGEs, including the Surface Type, Vegetation Index, Land Albedo, and several Land gridded global products. PGE311 generates the Surface Reflectance at both the Moderate Resolution (750m) and the Imagery Resolution (375m).

5.10.2 Production Rules for NPPDAPS

NPPDAPS runs PGE311 every 5 minutes after the PGEs that produce the L1 SDRs at both resolutions, Cloud Mask L2 IP, Aerosol Optical Thickness L2 IP, Aerosol Model Information, and the NCEP Granulation Swath has been successfully run for the 5-Minute data period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. The EDRIR has only one Surface Reflectance product, with SDSs at both resolutions. The Science Code has separate files for the 750m and 375m resolution data. The Output table below includes all of these files.

The input products to PGE311 are all in swath format with coordinates that determine the coordinates of the output Surface Reflectance swath products. * NPPDAPS will get NCEP ancillary data from NESDIS Central to make the NCEP granulation data set and will not make the corresponding NOGAPS data set. The total column ozone from the OMPS granulation data file will not be used until after the NPP Launch. Thus only the Basic Temporal production rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE311 are the standard ones that NPPDAPS provides for every PGE.

The following bands in the SDR are used as inputs:

VIIRS Imagery Resolution Reflectances and Brightness Temperatures

Band I1 Reflectances	Visible
Band I2 Reflectances	Near Infrared
Band I3 Reflectances	Short Wave Infrared

VIIRS Moderate Resolution Reflectances

Band M1 Reflectances	Visible
Band M2 Reflectances	Visible
Band M3 Reflectances	Visible
Band M4 Reflectances	Visible
Band M5 Reflectances	Visible
Band M7 Reflectances	Near Infrared
Band M8 Reflectances	Short Wave Infrared
Band M10 Reflectances	Short Wave Infrared
Band M11 Reflectances	Short Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude (Moderate Resolution)
Longitude (Moderate Resolution)
Latitude (Imagery Resolution)
Longitude (Imagery Resolution)

The NPPDAPS production rules are the following:

- Basic Temporal

5.10.3 VIIRS Input Products

NPP_VMAE_L1 VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_VIAE_L1 VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_CMIP_L2 VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m
NPP_VAOTIP_L2 VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VAMIIP_L2 VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m

5.10.4 External Ancillary Input Products

NCEP Data File with Swaths of Parameters at 750m Resolution:

The Current OPS Code and the SCI Code output each NCEP parameter into a separate granulation file. Below are the parameter files needed by the 2007 version of the OPS Code.

NCEP_PRWIP_L2 NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation
NCEP_PRESIP_L2 NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation

NCEP_COZIP_L2	NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation

The EDR-IR indicates that the NCEP GFS Granulation parameters will be output into one file. Below is the GFS file with parameters above that are needed by this PGE.

NCEP_GFS_ANC	NCEP Global Forecast System Parameters L2 Swath 750m Granulation (Total Column Precipitable Water) (Surface Pressure (Adjusted)) (Total Column Ozone)

NOGAPS Data File with Swaths of Parameters at 750m Resolution will only be used if NCEP file is not available:

NOGAPS_GFS_ANC	NOGAPS Global Forecast System Parameters L2 Swath 750m Granulation (In EDR-IR only.) (Surface Pressure)

OMPS Data File with Swaths of Parameters at 750m Resolution:

OMPS_COZ_ANC	OMPS/NPP Total Column Ozone First Guess 5-Min L2 Swath IP 750m (In EDR-IR only.)

5.10.5 Static Data Inputs

VIIRS-SR-AOTValues-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-AtmReflect-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-IP-AC-Int_LPEATE
VIIRS-SR-DownTrans-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-IncScatAngles-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-SatZenAngles-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-ScatAngDims-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-SolZenAngles-LUT.1.4.0.18.bin_LPEATE
VIIRS-SR-SphAlb-LUT.1.4.0.18.bin_LPEATE

5.10.6 VIIRS Output Products

NPP_SRFLIP_L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m (In EDR-IR only.)
NPP_SRFLMIP_L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m (In 2007 OPS Code and SCI Code.)
NPP_SRFLIIP_L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m (In 2007 OPS Code and SCI Code.)

5.10.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as "IRIX64 modular 6.5 011 001245 IP27".>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.

5.11VIIRS L2 Snow Cover (PGE307)

5.11.1 PGE Purpose and Description

The Snow Cover Algorithm is based on the MODIS Snow Cover algorithm and produces a binary type map with values of "snow" or "no snow". The algorithm primarily uses the surface reflectance in three VIIRS imagery bands to make the map.

5.11.2 Production Rules for NPPDAPS

The Snow Cover Algorithm is run at NPPDAPS in PGE307 after the Cloud Mask (PGE303), Retrieve Aerosol EDRs (PGE383), and Cloud Optical Properties (PGE306) have successfully completed for the 5-minute processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Imagery Resolution Reflectances

Band I1 Reflectances	Visible
Band I2 Reflectances	Near Infrared
Band I3 Reflectances	Short Wave Infrared

Imagery Resolution Brightness Temperatures

Band I5 Brightness Temperatures	Long Wave Infrared

Moderate Resolution Brightness Temperatures

Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle (Imagery Resolution)
Latitude (Imagery Resolution)
Longitude (Imagery Resolution)
Latitude (Moderate Resolution)
Longitude (Moderate Resolution)

PGE307 is run every 5 minutes. The input products to PGE307 are all in swath format with coordinates that determine the

coordinates of the output Snow Cover swath product. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE307 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.11.3 VIIRS Input Products

NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VCOPIP_L2	VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m

5.11.4 External Ancillary Input Products

None

5.11.5 Static Data Inputs

VIIRS-SCD-EDR-AC-Int.1.4_LPEATE
VIIRS-SCD-SNOW-COVER-QUAL-LUT.1.4.bin_LPEATE
VIIRS-SCD-SNOW-COVER-LUT.1.4.bin_LPEATE

5.11.6 VIIRS Output Products

NPP_VSCD_L2	VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m
NPP_VSCDIP_L2	VIIRS/NPP Snow Cover (Float32) 5-Min L2 Swath IP 750m (Output of 2007 OPS Code; not in EDR-IR. Plan to eliminate at Land PEATE in next version.)
NPP_VSCMQIP_L2	VIIRS/NPP Snow Cover Map & Quality 5-Min L2 Swath IP 375m (Output of 2007 OPS Code; not in EDR-IR.)

5.11.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>

CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.12VIIRS L2 Surface Type (PGE349)

5.12.1 PGE Purpose and Description

The Surface Type is determined at 1 km, the highest spatial resolution common to the VIIRS bands. The EDR will be produced for every VIIRS L2 granule. The Surface Type algorithm is built upon the VIIRS Gridded Surface Type Quarterly L3 Global IP at 1km resolution, which has been updated from the data accumulated over the past three months. This Gridded Surface Type Quarterly product is based on a classification method that uses MODIS and AVHRR training samples from land cover classes to train a decision tree classification algorithm. The current L2 swaths extracted from the VIIRS Gridded Surface Type and VIIRS Gridded Annual Min/Max Vegetation Index IPs, as well as current L2 swaths of Snow Cover, Active Fires, and Land Surface Reflectance are input to the algorithm to update the L2 Surface Type product.

5.12.2 Production Rules for NPPDAPS

The Surface Type Algorithm is run at NPPDAPS in PGE349 after the corresponding L2 swaths of Snow Cover, Active Fire, and Surface Reflectance have been produced for the current 5-minute processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following auxillary data are required for the algorithm:

Auxiliary Data:

Solar Azimuth Angle
Solar Zenith Angle
Sensor Azimuth Angle
Sensor Zenith Angle
Latitude
Longitude

PGE349 is run every 5 minutes. The input products to PGE349 are all in swath format with coordinates that determine the coordinates of the output L2 Surface Type product. Only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch PGE version. The Dynamic Runtime Parameters available for PGE349 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.12.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m (In 2007 OPS Code.)
NPP_VSCD_L2	VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m
NPP_AVAF_L2	VIIRS/NPP Active Fires 5-Min L2 Swath ARP 750m (In EDR-IR only.)
NPP_VAFIP_L2	VIIRS/NPP Fire Mask & Quality Flags 5-Min L2 Swath IP 750m (In 2007 OPS Code,)
NPP_SRFLIP_L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m (In EDR-IR only.)
NPP_SRFLMIP_L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m (In 2007 OPS Code.)
NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m (In 2007 OPS Code.)
NPP_VNDVIIP_L2	VIIRS/NPP Gridded NBAR NDVI 17-Day 5-Min L2 Swath IP 750m Granulation (In 2007 OPS Code.)
NPP_QSIP_L2	VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation
NPP_QMMVIIP_L2	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly 5-Min L2 Swath IP 750m Granulation

5.12.4 External Ancillary Input Products

None

5.12.5 Static Data Inputs

Surface Type Coefficients VIIRS-ST_EDR-AC-Int_LPEATE

5.12.6 VIIRS Output Products

NPP_VSUT_L2	VIIRS/NPP Surface Type 5-Min L2 Swath EDR 750m

5.12.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.13VIIRS L2 Land Albedo (PGE355)

5.13.1 PGE Purpose and Description

The structure and optical properties of the land surface determine the Bi-directional Reflectance Distribution Function (BRDF) and the albedo of the surface. The Land Albedo Algorithm integrates the BRDF to determine the surface reflectance in terms of its spectral, directional, spatial, and temporal properties.

5.13.2 Production Rules for NPPDAPS

The Land Albedo Algorithm is run at NPPDAPS in PGE355 after the L2 aerosol, snow cover, and surface reflectance products have been made for the current 5-minute processing period. The algorithm uses as input the L2 swath at 750m resolution from the Gridded Land Albedo 17-Day product to determine the albedo for the current period. The total column ozone from the L2 OMPS data file will not be used until after the NPP Launch when the NPP instruments have stabilized. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Moderate Resolution Reflectances

Band M1 Reflectances	Visible
Band M2 Reflectances	Visible
Band M3 Reflectances	Visible
Band M4 Reflectances	Visible
Band M5 Reflectances	Visible
Band M7 Reflectances	Near Infrared
Band M8 Reflectances	Short Wave Infrared
Band M10 Reflectances	Short Wave Infrared
Band M11 Reflectances	Short Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude
Longitude

PGE355 is run every 5 minutes. The input products to PGE355 are all in swath format with coordinates that determine the coordinates of the output Albedo swath product. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE355 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.13.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VAMIIP_L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m
NPP_SRFLIP_L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m
NPP_VSCD_L2	VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m
NPP_D17LALBIP_L2	VIIRS/NPP Gridded Land Albedo 17-Day 5-Min L2 Swath IP 750m Granulation

5.13.4 External Ancillary Input Products

NCEP Data File with Swaths of Parameters at 750m Resolution:

NCEP_GFSIP_L2	NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation (Total Column Precipitable Water) (Total Column Ozone Concentration)

OMPS Data File with Swaths of Parameters at 750m Resolution:

OMPS_COZ_ANC	OMPS/NPP Total Column Ozone First Guess 5-Min L2 Swath IP 750m

5.13.5 Static Data Inputs

TBD

5.11.6 VIIRS Output Products

NPP_VLAIP_L2	VIIRS/NPP Land Albedo 5-Min L2 Swath IP 750m

5.13.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.14VIIRS L2 Vegetation Index (PGE356)

5.14.1 PGE Purpose and Description

The Vegetation Index (VI) PGE generates two VI parameters at 375m resolution. Vegetation on the Earth's surface primarily absorbs energy at the blue band 0.470 um and 0.645 um red band and scatters almost all of the near infrared radiation. The ratio of the difference to the sum of the red and near-infrared bands provides a very sensitive measurement of the amount of vegetation. This ratio is called the Top of Atmosphere Normalized Differential Vegetation Index (NDVI). The Top of Canopy Enhanced Vegetation Index (EVI) is a better measurement under some conditions. Both the NDVI and EVI are written in the output EDR product.

5.14.2 Production Rules for NPPDAPS

The Vegetation Index algorithm is run at NPPDAPS in PGE356 after the Surface Reflectance PGE311 has completed successfully for the 5-minute processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The granulation PGE for the VIIRS Gridded Quarterly Surface Type must also be completed for this 5-minute period. The L1 SDR at both Imagery and Moderate resolutions are inputs. PGE356 produces one output VI EDR product at 375m resolution.

The following bands in the SDR are used as inputs:

Imagery Resolution TOA Reflectances

Band I1 Reflectances	Visible
Band I2 Reflectances	Near Infrared

Moderate Resolution Brightness Temperatures*

Band M3 Reflectances	***Visible***
Band M4 Reflectances	***Visible***
Band M5 Reflectances	***Visible***
Band M7 Reflectances	***Near Infrared***
Band M8 Reflectances	***Short Wave Infrared***
Band M10 Reflectances	***Short Wave Infrared***
Band M11 Reflectances	***Short Wave Infrared***

Auxiliary Data

Moderate Latitude
Moderate Longitude

Moderate Sensor Zenith*
Moderate Sensor Azimuth*
Moderate Solar Zenith*
Moderate Solar Azimuth*

The NPPDAPS production rule is the following:

- Basic Temporal

5.14.3 VIIRS Input Products

NPP_VIAE_L1 VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VMAE_L1 VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m (In EDR-IR 0nly.)

NPP_SRFLIP_L2 VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m (In EDR-IR only.)
NPP_SRFLIIP_L2 VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m (In 2007 OPS Code and SCI Code.)
NPP_SRFLMIP_L2 VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m (In 2007 OPS Code and SCI Code.)
NPP_QSIP_L2 VIIRS/NPP Gridded Surface Type Quarterly L2 Swath IP 750m Granulation (In SCI Code only.)

5.14.4 External Ancillary Input Products

None

5.14.5 Static Data Inputs

VIIRS-VI-EDR-AC-Int-1.4.0.18_LPEATE

5.14.6 VIIRS Output Products

NPP_VRVI_L2 VIIRS/NPP Vegetation Index 5-Min L2 Swath EDR 375m
NPP_SVVIIP_L2 VIIRS/NPP Leaf Area Index/FPAR 5-Min L2 Swath IP 375m (In SCI Code only,)

5.14.7 Dynamic Runtime Parameters

SatelliteInstrument <Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment <Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime <Start day and time for data observations.>

CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.15VIIRS L2 Land Surface Temperature (PGE316)

5.15.1 PGE Purpose and Description

The Land Surface Temperature (LST) Algorithm retrieves the skin land surface temperature for all types of land cover except over areas that are cloudy as determined by the VIIRS Cloud Mask. Separate equations are used for each type of land cover. The input VIIRS L2 Surface Type EDR determines the land type. Land surface temperatures for daytime and nighttime observations are retrieved separately using different sets of coefficients in the equations for each land type.

5.15.2 Production Rules for NPPDAPS

The Land Surface Temperature Algorithm is run at NPPDAPS in PGE316 after the PGE349 L2 Surface Type Algorithm is completed for the current processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Moderate Resolution Brightness Temperatures

Band M12 Brightness Temperatures	Mid Wave Infrared
Band M13 Brightness Temperatures	Mid Wave Infrared
Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data

Solar Zenith Angle
Sensor Zenith Angle
Latitude
Longitude

PGE316 is run every 5 minutes. The input products to PGE316 are all in swath format with coordinates that determine the coordinates of the output LST swath product. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE316 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.15.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VSUT_L2	VIIRS/NPP Surface Type 5-Min L2 Swath EDR 750m

5.15.4 External Ancillary Input Products

NRL Aerosol Analysis & Prediction System File with Swaths of Parameters at 750m Resolution:

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

5.15.5 Static Data Inputs

TBD

5.15.6 VIIRS Output Products

NPP_VLST_L2	VIIRS/NPP Land Surface Temperature 5-Min L2 Swath EDR 750m

5.15.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.16VIIRS L2 Ice Quality (PGE370)

5.16.1 PGE Purpose and Description

The VIIRS Ice Quality Algorithm determines the quality and weights of the pixels in the L2 swath at 375m resolution. It uses the VIIRS I1 visible, I2 near infrared, and I5 long-wave infrared imagery resolution bands in the measurements. It also uses the L2 VIIRS cloud mask, aerosol, and cloud optical properties as inputs.

5.16.2 Production Rules for NPPDAPS

The Ice Quality Algorithm is run at NPPDAPS in PGE370 after the VIRS L2 Cloud Mask, Retrieve Aerosol EDRs, and Cloud Optical Properties algorithms have been run for the current 5-minute processing period and the corresponding granulation of the NPPS Total Optical Depth have been completed. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Imagery Resolution Reflectances

Band I1 Reflectances	Visible
Band I2 Reflectances	Near Infrared

Imagery Resolution Brightness Temperatures

Band I5 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude
Longitude

PGE370 is run every 5 minutes. The input products to PGE370 are all in swath format with coordinates that determine the coordinates of the output Ice Quality and Ice Weights swath products. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE370 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.16.3 VIIRS Input Products

NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VCOPIP_L2	VIIRS/NPP Cloud Optical Properties 5-Min L2 Swath IP 750m

5.16.4 External Ancillary Input Products

NRL Aerosol Analysis & Prediction System File with Swaths of Parameters at 750m Resolution:

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

5.16.5 Static Data Inputs

TBD

5.16.6 VIIRS Output Products

NPP_VIQIP_L2 375m	VIIRS/NPP Ice Quality 5-Min L2 Swath IP
NPP_VIWIP_L2 375m	VIIRS/NPP Ice Weights 5-Min L2 Swath IP

5.16.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.17VIIRS L2 Ice Surface Temperature 375m (PGE371)

5.17.1 PGE Purpose and Description

The Ice Surface Temperature 375m Algorithm derives the temperature of the ice surface at VIIRS imagery resolution for use as input to VIIRS algorithms that process ice pixels at 375m resolution. It is needed to complement the Ice Surface Temperature EDR at 750m that is used by the Snow/Ice Algorithm.

5.17.2 Production Rules for NPPDAPS

The Ice Surface Temperature Algorithm is run at NPPDAPS in PGE371 after the corresponding L2 swaths of Aerosol Optical Thickness, Ice Quality, and Ice Weights have been produced for the 5-minute processing period. The granulation for the NAAPS Total Optical Depth ancillary data must also be complete for the processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Moderate Resolution Brightness Temperatures

Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Imagery Resolution Brightness Temperatures

Band I5 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle (Imagery Resolution)
Sensor Zenith Angle (Imagery Resolution)
Latitude (Imagery Resolution)
Longitude (Imagery Resolution)

PGE371 is run every 5 minutes. The input products to PGE371 are all in swath format with coordinates that determine the coordinates of the output Ice Surface Temperature swath product. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE371 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.17.3 VIIRS Input Products

NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VIQIP_L2	VIIRS/NPP Ice Quality 5-Min L2 Swath IP 375m
NPP_VIWIP_L2	VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m

5.17.4 External Ancillary Input Products

NRL Aerosol Analysis & Prediction System File with Swaths of Parameters at
750m Resolution:

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

5.17.5 Static Data Inputs

TBD

5.17.6 VIIRS Output Products

NPP_VSTIP_L2	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath IP 375m

5.17.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.18VIIRS L2 Ice Concentation (PGE374)

5.18.1 PGE Purpose and Description

The VIIRS Ice Concentration is defined as the fraction of a given area of sea water covered by ice. The VIIRS imagery bands of I1 visible and I2 near infrared are input to the Ice Concentration Algorithm. The algorithm derives the ice fraction for ice pixels in the L2 swath using tie point analysis of surface temperature and surface reflectance. The algorithm outputs IPs for Ice Concentration and for Ice Reflectance and Temperature at 375m resolution.

5.18.2 Production Rules for NPPDAPS

The Ice Quality Algorithm is run at NPPDAPS in PGE374 after the VIRS L2 algorithms for Ice Surface Temperature at 375m and Ice Quality at 375m have been run for the current 5-minute processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Imagery Resolution Reflectances

Band I1 Reflectances	Visible
Band I2 Reflectances	Near Infrared

Auxiliary Data:

Latitude
Longitude

PGE374 is run every 5 minutes. The input products to PGE374 are all in swath format with coordinates that determine the coordinates of the output Ice Concentration and Ice Reflectance/Temperature swath products. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE374 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.18.3 VIIRS Input Products

NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VSTIP_L2	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath IP 375m
NPP_VIWIP_L2	VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m
NPP_VIQIP_L2	VIIRS/NPP Ice Quality 5-Min L2 Swath IP 375m

5.18.4 External Ancillary Input Products

None

5.18.5 Static Data Inputs

TBD

5.18.6 VIIRS Output Products

NPP_VICIP_L2	VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m
NPP_VIRTIP_L2	VIIRS/NPP Ice Reflectance/Temperature 5-Min L2 Swath IP 375m

5.18.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.19VIIRS L2 Ice Surface Temperature 750m (PGE373)

5.19.1 PGE Purpose and Description

The Ice Surface Temperature 750m Algorithm derives the surface temperature over snow and ice except for very cloudy scenes. It is based on water vapor correction algorithms and uses a regression equation to determine the skin ice surface temperature at 750m resolution.

5.19.2 Production Rules for NPPDAPS

The Ice Surface Temperature Algorithm is run at NPPDAPS in PGE373 after the corresponding L2 swaths of Cloud Mask, Aerosol Optical Thickness, and Ice Concentration have been produced for the 5-minute processing period. The granulation for the NAAPS Total Optical Depth ancillary data must also be complete for the processing period. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following bands in the SDR are used as inputs:

Moderate Resolution Brightness Temperatures

Band M15 Brightness Temperatures	Long Wave Infrared
Band M16 Brightness Temperatures	Long Wave Infrared

Auxiliary Data:

Solar Zenith Angle
Sensor Zenith Angle
Latitude
Longitude

PGE373 is run every 5 minutes. The input products to PGE373 are all in swath format with coordinates that determine the coordinates of the output Ice Surface Temperature swath product. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available for PGE373 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.19.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_CMIP_L2	VIIRS/NPP Cloud Mask 5-Min L2 Swath IP 750m
NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VICIP_L2	VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m

5.19.4 External Ancillary Input Products

NRL Aerosol Analysis & Prediction System File with Swaths of Parameters at 750m Resolution:

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

5.19.5 Static Data Inputs

TBD

5.19.6 VIIRS Output Products

NPP_VIST_L2	VIIRS/NPP Ice Surface Temperature 5-Min L2 Swath EDR 750m

5.19.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.20VIIRS L2 Sea Ice Characterization/ Ice Age (PGE308)

5.20.1 PGE Purpose and Description

Sea Ice Age is best determined by microwave retrievals, but the results are only completely reliable for clear sky scenes. An automatic digital retrieval of sea ice age from any visible/infrared instrument is not possible. Methods using correlation of sea ice temperatures that worked well for new, young , and thick ice in limited area studies are to be applied in the VIIRS Sea Ice Characterization/ Ice age Algorithm. The algorithm uses inputs of the corresponding VIIRS L2 swaths of ice quality, ice weights, ice concentration, ice reflectance/temperature, aerosol optical thickness, and aerosol model information, as well as the matching granulation swaths extracted from the VIIRS Gridded Previous Ice Age IP, NCEP Global Forecast System (GFS) Parameters, and NAAPS Total Optical Depth (TOD) to make the correlations that characterize the sea ice and determine the ice age. The output products are the VIIRS Sea Ice Characterization/Ice Age EDR and the VIIRS Ice Albedo IP.

5.20.2 Production Rules for NPPDAPS

The Sea Ice Characterization/Ice Age Algorithm is run at NPPDAPS in PGE308 after the VIRS L2 Ice Quality and Ice Concentration algorithms have been run for the current 5-minute processing period and the corresponding granulation of the VIIRS Gridded Previous Ice Age, NCEP GFS Parameters, and NAAPS TOD have been completed. The total column ozone from the L2 OMPS data file will not be used until after the NPP Launch when the NPP instruments have stabilized. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available.

The following Auxiliary Data are used as inputs:

Auxiliary Data:

Solar Zenith Angle
Solar Azimuth Angle
Sensor Zenith Angle
Sensor Azimuth Angle
Latitude
Longitude

PGE308 is run every 5 minutes. The input products to PGE308 are all in swath format with coordinates that determine the coordinates of the output Sea Ice Characterization/Ice Age and Ice Albedo swath products. Thus only the Basic Temporal Production Rule is required at NPPDAPS for the pre-launch version of the PGE. The Dynamic Runtime Parameters available

for PGE308 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.20.3 VIIRS Input Products

NPP_VAOTIP_L2	VIIRS/NPP Aerosol Optical Thickness 5-Min L2 Swath IP 750m
NPP_VAMIIP_L2	VIIRS/NPP Aerosol Model Information 5-Min L2 Swath IP 750m
NPP_VIWIP_L2	VIIRS/NPP Ice Weights 5-Min L2 Swath IP 375m
NPP_VIQIP_L2	VIIRS/NPP Ice Quality 5-Min L2 Swath IP 375m
NPP_VICIP_L2	VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m
NPP_VIRTIP_L2	VIIRS/NPP Ice Reflectance/Temperature 5-Min L2 Swath IP 375m
NPP_VPIAIP_L2	VIIRS/NPP Gridded Previous Ice Age 5-Min L2 Swath IP 375m Granulation

5.20.4 External Ancillary Input Products

NCEP Data File with Swaths of Parameters at 750m Resolution:

NCEP_GFSIP_L2	NCEP Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation (Adjusted Surface Pressure) (Sea Surface Wind Speed and Direction) (Specific Humidity at Surface) (Surface Air Temperature) (Total Column Ozone Concentration) (Total Column Precipitable Water)

OMPS Data File with Swaths of Parameters at 750m Resolution:

OMPS_COZ_ANC	OMPS/NPP Total Column Ozone First Guess 5-Min L2 Swath IP 750m

NRL Aerosol Analysis & Prediction System File with Swaths of Parameters at
750m Resolution:

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

5.20.5 Static Data Inputs

TBD

5.20.6 VIIRS Output Products

NPP_VSIC_L2	VIIRS/NPP Sea Ice Characterization/Ice Age 5-Min L2 Swath EDR 375m
NPP_VIAIP_L2 375m	VIIRS/NPP Ice Albedo 5-Min L2 Swath IP

5.20.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.21VIIRS NCEP Global Forecast System 750m Granulation (PGE350)

5.21.1 PGE Purpose and Description

PGE350 inputs a 6-Hour NCEP Global Forecast System (GFS) data file at 1 degree resolution and a Level 1 Terrain Corrected Geolocation file at 750m resolution or the Level 1 Moderate Resolution SDR to extract a Level 2 swath from the NCEP GFS 6-hour file matching the coordinates of the Geolocation swath and output a file containing the swath of extracted NCEP data at 750m granulation in HDF format. There are several modifications to the original parameters in the NCEP file that make the parameters more useful to the VIIRS algorithms. The U and V components of the Sea Surface Winds are converted to wind speed and direction after interpolation for the output swaths. Spatial interpolation of Surface Pressure is performed in natural logarithm of pressure, ln(p), to the target location. The NCEP 750m granulated data file contains most of the parameters required by the VIIRS algorithms.

5.21.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS NCEP GFS 750m Granulation PGE after each Terrain Corrected Geolocation L1 granule or each VIIRS L1 Moderate Resolution SDR is produced. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. Each swath of granulated VIIRS data must be produced from the NCEP 6-hour gridded global data set before the L2 VIIRS PGEs that input that swath are run. The parameters included in the NCEP granulated swath are listed under the VIIRS output products section below.

NPPDAPS stages the 6-hour gridded, global NCEP file that overlaps the 5-minute time period of the L1 Geolocation swath that is input to the PGE. In addition to the Basic Temporal, the Advanced Temporal Production Rule is required by PGE350.
The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.19.3 VIIRS Input Products

NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m

5.21.4 External Ancillary Input Products

The SCI Code and 2007 OPS Code use the NCEP GDAS_0ZF 6-hour 1 degree files as input to PGE350. The EDR-IR indicates that NCEP is expected to provide the new Global Forecast System (GFS) Parameters files.

NCEP_GFS_ANC	NCEP Global Forecast System Parameters 6-Hour L3 Global 1Deg

5.21.5 Static Data Inputs

None

5.21.6 VIIRS Output Products

The Current OPS Code and the SCI Code output each NCEP parameter into a separate granulation file. Below are the parameter files output by the 2007 version of the OPS Code.

NCEP_AIRTIP_L2	NCEP Surface Air Temperature 5-Min L2 Swath IP 750m Granulation
NCEP_COZIP_L2	NCEP Total Column Ozone 5-Min L2 Swath IP 750m Granulation
NCEP_HGHTIP_L2	NCEP Geopotential Surface Height 5-Min L2 Swath IP 750m Granulation
NCEP_PRESIP_L2	NCEP Surface Pressure 5-Min L2 Swath IP 750m Granulation
NCEP_PRWIP_L2	NCEP Total Column Precipitable Water 5-Min L2 Swath IP 750m Granulation
NCEP_WDIRIP_L2	NCEP Surface Wind Direction 5-Min L2 Swath IP 750m Granulation
NCEP_WSPDIP_L2	NCEP Surface Wind Speed 5-Min L2 Swath IP 750m Granulation
NCEP_AMPIP_L2	NCEP Atmospheric Moisture Profile 5-Min L2 Swath IP 750m Granulation
NCEP_ATPIP_L2	NCEP Atmospheric Temperature Profile 5-Min L2 Swath IP 750m Granulation
NCEP_GHPIP_L2	NCEP Geopotential Height Profile 5-Min L2 Swath IP 750m Granulation

The EDR-IR indicates that the NCEP GFS Granulation parameters will be output into one file. Below are the complete set of parameters available to be output by PGE350.

NCEP_GFSIP_L2	NCEP Global Forecast System Parameters L2 Swath IP 750m Granulation (Geopotential Height at Pressure Levels) (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure)

(Sea Surface Wind (Speed and Direction))
(Specific Humidity at Surface)
(Surface Air Temperature)
(Surface Pressure (Adjusted))
(Total Column Ozone Concentration)
(Total Column Precipitable Water)
(Tropopause Height)
(Water Vapor Mixing Ratio at Pressure Levels)
(Atmospheric Moisture Profile)
(Atmospheric Temperature Profile)
(Geopotential Height Profile)

5.21.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.

5.22VIIRS NAAPS Total Optical Depth 750m Granulation (PGE351)

5.22.1 PGE Purpose and Description

The NAAPS Total Optical Depth (TOD) Granulation Algorithm inputs a L3 Gridded NAAPS Total Optical Depth forecast file and a VIIRS Moderate Resolution L1 SDR to extract the matching swath of Total Optical Depth data at 750m resolution.

5.22.2 Production Rules for NPPDAPS

NPPDAPS runs the NAAPS TOD 750m Granulation PGE351 after each VIIRS Moderate Resolution granule is produced and the NAAPS Total Optical Depth forecast file for the corresponding time period is available. NPPDAPS stages the gridded, global NAAPS file that overlaps the 5-minute time period of the L1 SDR swath that is input to the PGE. In addition to the Basic Temporal, the Advanced Temporal Production Rule is required by PGE351 to stage the NAAPS file. The PGE will be run in a L2 recipe that activates the PGE 288 times per day as the input SDR files become available. Each swath of granulated TOD data must be produced before the L2 VIIRS PGEs that input that swath are run.

The following fields in the Auxiliary Data are used as inputs:

Auxiliary Data:

Latitude (Moderate Resolution)
Longitude (Moderate Resolution)

The Dynamic Runtime Parameters available for PGE351 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.22.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS Moderate Resolution 5-Min L1 Swath SDR 750m

5.22.4 External Ancillary Input Products

NAAPS_TOD_ANC	NAAPS Total Optical Depth L3 Global

5.22.5 Static Data Inputs

TBD

5.22.6 VIIRS Output Products

NAAPS_TODIP_L2	NAAPS Total Optical Depth 5-Min L2 Swath IP 750m Granulation

5.22.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.23VIIRS Global Land Cover 750m Granulation (PGE352)

5.23.1 PGE Purpose and Description

PGE352 inputs the USGS Land Cover Characteristic DB Olson Global Ecosystems data file and a Level 1Terrain Corrected Geolocation file or Level 1 Moderate Resolution SDR at 750m resolution to extract a Level 2 swath from the file matching the coordinates of the Geolocation swath and output a file containing the swath of extracted USGS Land Cover data at 750m granulation in HDF format.

5.23.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS Global Land Cover 750m Granulation PGE after each Terrain Corrected Geolocation L1 granule is produced. The USGS Olson Ecosystems Map is a static, climatological data set. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input L1 Geolocation files become available. Each swath of granulated VIIRS data must be produced from the USGS Land Cover gridded, global data set before the L2 VIIRS PGEs that input that swath are run.

The NPPDAPS production rule is the following:

- Basic Temporal

5.23.3 VIIRS Input Products

NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m

5.23.4 External Ancillary Input Products

USGS_ECOS_ANC	USGS GLCC Global Olson Ecosystems L3 Global 18km

5.23.5 Static Data Inputs

None

5.23.6 VIIRS Output Products

USGS_ECOSIP_L2	USGS GLCC Global Olson Ecosystems 5-Min L2 Swath IP 750m Granulation

5.23.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.24VIIRS Gridded IP 750m and 375m Granulation (PGE353)

5.24.1 PGE Purpose and Description

PGE353 inputs VIIRS gridded global IP data sets at 1km resolution and Level 1 Terrain Corrected Geolocation files at 750m and 375m or sets of Level 1 Moderate and Imagery Resolution SDR files at 750m and 375m, respectively, to extract Level 2 swaths from the VIIRS gridded, global files matching the coordinates of the Geolocation swath. PGE353 outputs files containing the swaths of extracted data at 750m and 375m granulation in HDF format for all of the gridded data sets input to the PGE.

5.24.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS Gridded IP 750m and 375m Granulation PGE after each Terrain Corrected Geolocation L1 granule is produced. PGE353 will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. Each swath of granulated VIIRS data must be produced from gridded global data before the L2 VIIRS PGEs that input that swath are run.

NPPDAPS requires the Advanced Temporal Production Rule to stage the VIIRS L3 gridded data files that overlap the 5-minute processing period. The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.24.3 VIIRS Input Products

NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_VMAE__L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_VSNICIP_L3	VIIRS/NPP Gridded Snow/Ice Cover L3 Global IP 1km
NPP_D17LALBIP_L3	VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km
NPP_D17BRDFIP_L3	VIIRS/NPP Gridded BRDF Archetypal 17-Day L3 Global IP 1km
NPP_QMMVIIP_L3	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L3 Global IP 1km
NPP_VNDVIIP_L3	VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km
NPP_QSIP_L3	VIIRS/NPP Gridded Surface Type Quarterly L3 Global IP 1km

NPP_IMFT_L1	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VPIAIP_L3	VIIRS/NPP Gridded Previous Ice Age L3 Global IP 1km

5.24.4 External Ancillary Input Products

None

5.24.5 Static Data Inputs

None

5.24.6 VIIRS Output Products

NPP_VSNICIP_L2	VIIRS/NPP Gridded Snow/Ice Cover 5-Min L2 Swath IP 750m Granulation
NPP_D17LALBIP_L2	VIIRS/NPP Gridded Land Albedo 17-Day 5-Min L2 Swath IP 750m Granulation
NPP_D17BRDFIP_L2	VIIRS/NPP Gridded BRDF Archetypal 17-Day 5-Min L2 Swath IP 750m Granulation
NPP_QMMVIIP_L2	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly 5-Min L2 Swath IP 750m Granulation
NPP_VNDVIIP_L2	VIIRS/NPP Gridded NBAR NDVI 17-Day 5-Min L2 Swath IP 750m Granulation
NPP_QSIP_L2	VIIRS/NPP Gridded Surface Type Quarterly 5-Min L2 Swath IP 750m Granulation
NPP_VPIAIP_L2	VIIRS/NPP Gridded Previous Ice Age 5-Min L2 Swath IP 375m Granulation

5.24.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.25 VIIRS MODIS Land-Water Mask 750m Granulation (PGE360)

5.25.1 PGE Purpose and Description

The VIIRS MODIS Land-Water Mask Granulation Algorithm inputs the MODIS Land-Water Mask global climatology data set at 30 arc-seconds resolution and a VIIRS Moderate Resolution L1 SDR or the corresponding Geolocation file to extract the matching swath of Land-Water Mask data at 750m resolution.

5.25.2 Production Rules for NPPDAPS

NPPDAPS runs the MODIS Land-Water Mask 750m Granulation PGE360 after each VIIRS Geolocation and corresponding VIIRS Moderate Resolution SDR granules are produced. The MODIS Land-Water Mask is a static, global climatology data set. NPPDAPS stages the L1 Moderate Resolution SDR or the corresponding Geolocation file and the gridded MODIS Land-Water Mask to extract the Land-Water Mask matching swath. The PGE will be run in a L2 recipe that activates the PGE 288 times per day as the 5-minute SDR files become available. Each swath of granulated Land-Water Mask data must be produced before the L2 VIIRS PGEs that input that swath are run.

The following fields in the Auxiliary Data are used as inputs:

Auxiliary Data:

Latitude (Moderate Resolution)
Longitude (Moderate Resolution)

The Dynamic Runtime Parameters available for PGE360 are the standard ones that NPPDAPS provides for every PGE.

The NPPDAPS production rules are the following:

- Basic Temporal

5.25.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m

5.25.4 External Ancillary Input Products

MODIS_LWM_ANC` MODIS Land-Water Mask L3 Global 30 arc-seconds

5.25.5 Static Data Inputs

TBD

5.25.6 VIIRS Output Products

MODIS_LWMIP_L2	MODIS Land-Water Mask 5-Min L2 Swath IP 750m Granulation

5.25.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.26 VIIRS NOGAPS 750m Granulation (PGE376)

5.26.1 PGE Purpose and Description

PGE376 inputs a 6-Hour NOGAPS data file at 1 degree resolution and a Level 1 Terrain Corrected Geolocation file at 750m resolution or the Level 1 Moderate Resolution SDR to extract a Level 2 swath from the NOGAPS 6-hour file matching the coordinates of the Geolocation swath and output a file containing the swath of extracted NOGAPS data at 750m granulation in HDF format. In addition to extracting the swath parameters, the algorithm converts the Sea Surface Winds U and V components in the NOGAPS file to Sea Surface Winds Speed and Direction and performs a spatial interpolation of Surface Pressure in natural logarithm of pressure, ln(p), to the target location. The NOGAPS 750m granulated data file contains most of the ancillary parameters required by the VIIRS PGEs. It does not contain the Total Column Ozone that is contained in the NCEP GFS Parameters file. See NCEP 750m Granulation for profile and pressure level data.

5.26.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS NOGAPS 750m Granulation PGE after each Terrain Corrected Geolocation L1 granule or each VIIRS L1 Moderate Resolution SDR is produced. The PGE will be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. Each swath of granulated VIIRS data must be produced from the NOGAPS 6-hour gridded global data set before the L2 VIIRS PGEs that input that swath are run. The parameters included in the NOGAPS granulated swath are listed under the VIIRS output products section below.

NPPDAPS stages the 6-hour gridded, global NOGAPS file that overlaps the 5-minute time period of the L1 Geolocation swath that is input to the PGE. In addition to the Basic Temporal, the Advanced Temporal Production Rule is required by PGE376.

The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.26.3 VIIRS Input Products

NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m

5.26.4 External Ancillary Input Products

NOGAPS_GFS_ANC	NOGAPS Global Forecast System Parameters 6-Hour L3 Global 1Deg

5.26.5 Static Data Inputs

None

5.26.6 VIIRS Output Products

NOGAPS_GFSIP_L2	NOGAPS Global Forecast System Parameters 5-Min L2 Swath IP 750m Granulation
NCEP_GFSIP_L2	NCEP Global Forecast System Parameters L2 Swath IP 750m Granulation (Geopotential Height at Pressure Levels) (Geopotential Height of Surface) (Isobaric Level Temperature) (Relative Humidity at Pressure Levels) (Sea Level Pressure) (Sea Surface Wind (Speed and Direction)) (Specific Humidity at Surface) (Surface Air Temperature) (Surface Pressure (Adjusted)) (Total Column Precipitable Water) (Tropopause Height) (Water Vapor Mixing Ratio at Pressure Levels) (Atmospheric Moisture Profile) (Atmospheric Temperature Profile) (Geopotential Height Profile)

5.26.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.

5.27VIIRS Snow/Ice Cover Gridding (PGE314)

5.27.1 PGE Purpose and Description

PGE314 inputs the VIIRS Gridded Snow/Ice Cover Global IP data set at 1km resolution, a Level 1Terrain Corrected Geolocation file or a Level 1 Moderate Resolution SDR at 750m resolution, and Level 2 swath granules of Snow Cover at 750m resolution and Ice Concentration at 375m resolution to update the gridded Snow/Ice Cover data set using a gridding algorithm that will indicate the presence of snow and/or ice for each pixel observed in the swath.

5.27.2 Production Rules for NPPDAPS

NPPDAPS can run the VIIRS Snow/Ice Cover Gridding PGE314 after each new set of Snow Cover and Ice Concentration 5-minute swaths are produced. These new swaths were produced by PGEs that input the Terrain Corrected Geolocation L1 granule that is also input to PGE314. The PGE would then be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. However, since the swath area is not observed again until the next orbit, PGE314 will be run on an orbit basis.

The type of gridding after every 5-minute set of L2 input products are made is called continuous gridding in the EDRIR and other NPP documents. The VIIRS gridded global data set should be updated before the next observation of any part of the current swath occurs in a new swath. This requirement is fulfilled if updates are made on a orbit basis. At NPPDAPS it is more efficient to run the gridding PGEs every orbit.

Snapshots of the VIIRS L3 Gridded Snow/Ice Cover Global IP will be archived at specified time periods. Thus NPPDAPS will require the Advanced Temporal Production Rule to stage the version of the Snow/Ice Cover file that overlaps the input L2 Snow Cover and Ice Concentration data to update the global grid. The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.27.3 VIIRS Input Products

NPP_IMFT_L1	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_VIAE_L1	VIIRS/NPP Imagery Resolution SDR 375m
NPP_SVSC_L2	VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m
NPP_VICIP_L2	VIIRS/NPP Ice Concentration 5-Min L2 Swath IP 375m
NPP_VSNICIP_L3	VIIRS/NPP Gridded Snow/Ice Cover L3 Global IP 1km

5.27.4 External Ancillary Input Products

None

5.27.5 Static Data Inputs

None

5.27.6 VIIRS Output Products

NPP_VSNICIP_L3 VIIRS/NPP Gridded Snow/Ice Cover L3 Global IP 1km

5.27.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.28VIIRS Previous Ice Age Gridding (PGE315)

5.28.1 PGE Purpose and Description

PGE315 inputs the VIIRS Gridded Previous Ice Age Global IP data set at 1km resolution, a Level 1Terrain Corrected Geolocation file or a Level 1 Imagery Resolution SDR at 375m resolution, and a Level 2 swath granule of Sea Ice Characterization/Ice Age at 375m resolution to update the gridded Previous Ice Age data set that indicates the most recent and accurate ice age.

5.28.2 Production Rules for NPPDAPS

NPPDAPS can run the VIIRS Previous Ice Age Gridding PGE315 after each new Sea Ice Characterization/Ice Age 5-minute swath is produced. This new swath was produced by a PGE that input the Terrain Corrected Geolocation L1 granule that is also input to PGE315. The PGE would then be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. However, since the swath area is not observed again until the next orbit, PGE315 will be run on an orbit basis.

The type of gridding after every 5-minute set of L2 input products are made is called continuous gridding in the EDRIR and other NPP documents. The VIIRS gridded global data set should be updated before the next observation of any part of the current swath occurs in a new swath. This requirement is fulfilled if updates are made on a orbit basis. At NPPDAPS it is more efficient to run the gridding PGEs every orbit.

Snapshots of the VIIRS L3 Gridded Ice Age Global IP will be archived at specified time periods. Thus NPPDAPS will require the Advanced Temporal Production Rule to stage the version of the Previous Ice Age file that overlaps the input L2 Sea Ice Characterization/Ice Age data to update the global grid. The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.28.3 VIIRS Input Products

NPP_IMFT_L1	VIIRS/NPP Imagery Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 375m
NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VSIC_L2	VIIRS/NPP Sea Ice Characterization/Ice Age 5-Min L2 Swath EDR 375m
NPP_VPIAIP_L3 IP 1km	VIIRS/NPP Gridded Previous Ice Age L3 Global

5.28.4 External Ancillary Input Products

None

5.28.5 Static Data Inputs

None

5.28.6 VIIRS Output Products

NPP_VPIAIP_L3	VIIRS/NPP Gridded Previous Ice Age L3 Global IP 1km

5.28.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.29VIIRS Daily Surface Reflectance Collection Gridding (PGE313)

5.29.1 PGE Purpose and Description

PGE313 inputs up to 288 5-minute Level 1 Terrain Corrected Geolocation or Level 1 Moderate Resolution SDR files at 750m resolution and up to 288 corresponding 5-minute Level 2 swath granules of Surface Reflectance at 375m and 750m resolution for the current day to produce the gridded daily Surface Reflectance data set using a gridding algorithm that produces a global grid containing all valid observations of surface reflectance for the day.

5.29.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS Daily Surface Reflectance Gridding PGE313 after production of the Surface Reflectance 5-minute swaths are completed for the current day. A maximum of 288 5-minute granules are input to the PGE each day. The corresponding L1 Terrain Corrected Geolocation swaths or L1 Moderate Resolution SDR swaths are also required, The VIIRS Science Team will provide information on the minimum number of input 5-minute Surface Reflectance and Geolocation granules that must be available to produce a product of acceptable quality.

NPPDAPS will require the Advanced Temporal Production Rule to stage all of the L2 swath data that fall within the daily processing period. The NPPDAPS production rules are the following:

- Period Specification
- Minimum Number of Granules
- Advance Temporal

5.29.3 VIIRS Input Products

NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_SRFLIP_L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m

5.29.4 External Ancillary Input Products

None

5.29.5 Static Data Inputs

None

5.29.6 VIIRS Output Products

NPP_DSRFIP_L3	VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km

5.29.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.30VIIRS Monthly Product CV MVC Gridding (PGE318)

5.30.1 PGE Purpose and Description

The VIIRS Monthly Product Constrained View Maximum Value Composite (CV MVC) Gridding algorithm is a swath-based process that updates the VIIRS monthly gridded IP. PGE318 inputs the VIIRS Gridded Brightness Temperature (BT), Surface Reflectance (SR), and Vegetation Index (VI) Monthly Global IP data set at 1km resolution, a Level 1 Moderate Resolution SDR at 750m resolution, and the Level 2 swath granule of Surface Reflectance containing data at 750m resolution to update the monthly, gridded data set. The L1 SDR contains the Brightness Temperature for the swath.

5.30.2 Production Rules for NPPDAPS

NPPDAPS can run the VIIRS Monthly Product CV MVC Gridding PGE318 after each new Surface Reflectance 5-minute swath at 750m resolution is produced. The new Surface Reflectance swath was produced by a PGE that input the matching L1 Moderate Resolution SDR granule that is also input to PGE318. The PGE would then be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. However, since no granulation swaths of the monthly data set are needed by the L2 VIIRS PGEs at NPPDAPS, PGE318 will be run on a daily basis to archive the updates of the monthly product.

The VIIRS L3 Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly Global IP will be archived and retained as a monthly data set at NPPDAPS every month. Thus NPPDAPS will require the Advanced Temporal Production Rule to stage the version of the monthly global file that overlaps the input L2 Surface Reflectance data to update the global grid. The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.30.3 VIIRS Input Products

NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_SRFLIP_L2	VIIRS/NPP Land Surface Reflectance 5-Min L2 Swath IP 375m & 750m
NPP_MBTSRVIIP_L3	VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km

5.30.4 External Ancillary Input Products

None

5.30.5 Static Data Inputs

None

5.30.6 VIIRS Output Products

NPP_MBTSRVIIP_L3	VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km

5.30.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.31VIIRS 17-Day NBAR NDVI Gridding (PGE317)

5.31.1 PGE Purpose and Description

PGE317 inputs the VIIRS Gridded NBAR NDVI 17-Day Global IP data set at 5km resolution, a Level 1 Terrain Corrected Geolocation file or a Level 1 Moderate Resolution SDR at 750m resolution, and a Level 2 swath granule of Surface Reflectance at 750m resolution to update the gridded 17-Day NBAR NDVI data set.

5.31.2 Production Rules for NPPDAPS

NPPDAPS can run the VIIRS 17-Day NBAR NDVI Gridding PGE317 after each new Surface Reflectance 5-minute swath is produced. This new swath was produced by a PGE that input the Terrain Corrected Geolocation L1 granule that is also input to PGE317. The PGE would then be run in a Level 2 Recipe that activates the PGE 288 times per day as the input files become available. However, since the swath area is not observed again until the next orbit, PGE317 will be run on an orbit basis.

The type of gridding after every 5-minute set of L2 input products are made is called continuous gridding in the EDRIR and other NPP documents. The VIIRS gridded global data set should be updated before the next observation of any part of the current swath occurs in a new swath. This requirement is fulfilled if updates are made on a orbit basis. At NPPDAPS it is more efficient to run the gridding PGEs every orbit.

Thus NPPDAPS will require the Advanced Temporal Production Rule to stage the version of the 17-day global file that overlaps the input L2 Surface Reflectance data to update the global grid. The NPPDAPS production rules are the following:

- Basic Temporal
- Advanced Temporal

5.31.3 VIIRS Input Products

NPP_MOFT_L1	VIIRS/NPP Moderate Resolution Terrain Corrected Geolocation 5-Min L1 Swath IP 750m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m
NPP_SRFLIP	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m & 750m
NPP_VNDVIIP_L3	VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km

5.31.4 External Ancillary Input Products

None

5.31.5 Static Data Inputs

None

5.31.6 VIIRS Output Products

NPP_VNDVIIP_L3 VIIRS/NPP Gridded NBAR NDVI 17-Day L3 Global IP 5km

5.31.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as "IRIX64 modular 6.5 011 001245 IP27".>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.32VIIRS 17-Day Land Albedo IP Gridding (PGE319)

5.32.1 PGE Purpose and Description

PGE319 inputs the VIIRS Gridded 17-Day Land Albedo and BRDF Archetypal Global IP data sets at 1km resolution and 17 consecutive days of the VIIRS Gridded Surface Reflectance Daily Global IP data set at 750m resolution to update the gridded 17-day Land Albedo and BRDF Archetypal data sets. If the daily Surface Reflectance data are of good quality, the gridded BRDF Archetypal IP data are updated with new values. If the daily Surface Reflectance data are not of good quality, the historic data from the gridded BRDF Archetypal IP are used.

5.32.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS Land Albedo Gridding PGE319 after the production of each new set of 17-days of Daily Surface Reflectance are completed. The PGE will be run in a Level 3 Recipe that activates the PGE once every 17 days as the input files become available. The VIIRS Science Team will provide information on the minimum number of input daily Surface Reflectance granules that must be available to produce a product of acceptable quality.

Thus NPPDAPS will require the Advanced Temporal Production Rule to stage the version of the 17-day global files that overlap the input daily gridded Surface Reflectance data to update the global grids. The NPPDAPS production rules are the following:

- Period Start of 17-Days
- Minimum Number of Granules
- Advanced Temporal

5.32.3 VIIRS Input Products

NPP_DSRFIP_L3	VIIRS/NPP Gridded Surface Reflectance Daily L3 Global IP 1km
NPP_D17LALBIP_L3	VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km
NPP_D17BRDFIP_L3	VIIRS/NPP BRDF Archetypal 17-Day L3 Global IP 1km

5.32.4 External Ancillary Input Products

None

5.32.5 Static Data Inputs

None

5.32.6 VIIRS Output Products

NPP_D17LALBIP_L3	VIIRS/NPP Gridded Land Albedo 17-Day L3 Global IP 1km
NPP_D17BRDFIP_L3	VIIRS/NPP BRDF Archetypal 17-Day L3 Global IP 1km

5.32.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

5.33VIIRS Quarterly Surface Type IP Gridding (PGE341)

5.33.1 PGE Purpose and Description

PGE341 inputs three VIIRS Gridded Monthly Surface Reflectance, Vegetation Index, and Brightness Temperature IP data sets to produce the VIIRS Gridded Quarterly Min/Max Vegetation Index and Quarterly Surface Types IP data sets at 1km resolution. Both output data sets are generated and replaced every 3 months. The Vegetation Index is considered to be an annual product that is replaced quarterly.

5.33.2 Production Rules for NPPDAPS

NPPDAPS runs the VIIRS Quarterly Surface Type Gridding PGE341 after the production of the current set of three monthly gridded Surface Reflectance, Vegetation Index, and Brightness Temperatures input products completed. The PGE will be run in a Level 3 Recipe that activates the PGE once every 3 months as the input files for the quarter become available. The VIIRS Science Team will provide information on the minimum number of input monthly Surface Reflectance, Vegetation Index, and Brightness Temperatures files that must be available to produce a product of acceptable quality.

Thus NPPDAPS will require the Advanced Temporal Production Rule to stage the 3 input monthly gridded Brightness Temperature, Surface Reflectance, and Vegetation Index files to make the gridded, global Quarterly Surface Type and Annual Min/Max Vegetation Index products. The NPPDAPS production rules are the following:

- Period Start of Quarter (3 months)
- Minimum Number of Granules
- Advanced Temporal

5.33.3 VIIRS Input Products

NPP_MBTSRVIIP_L3	VIIRS/NPP Gridded Brightness Temperature, Surface Reflectance, & Vegetation Index Monthly L3 Global IP 1km

5.33.4 External Ancillary Input Products

None

5.33.5 Static Data Inputs

None

5.33.6 VIIRS Output Products

NPP_QMMVIIP_L3	VIIRS/NPP Gridded Annual Min/Max Vegetation Index Quarterly L3 Global IP 1km
NPP_QSIP_L3	VIIRS/NPP Gridded Surface Type Quarterly L3 Global IP 1km

5.33.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>

6 INDIVIDUAL LAND PEATE DDR PGE DESCRIPTIONS

6.1 VIIRS L2G DDR Observation Pointers and Geolocation Angles (PGE342)

6.1.1 PGE Purpose and Description

PGE342 supports the L2G land processing at NPPDAPS by creating the observation pointers and the associated geolocation angles to aggregate swath granules to Land tiles, PGE342 produces some of the files required for L2G land processing, namely the L2G pointer maps in the Sinusoidal projection at two resolutions: 1km (NPP_DPT1KD_L2GD, NPP_DPT1KN_L2GD), 500m (NPP_DPTHKD_L2GD, NPP_DPTHKN_L2GD), and the L2G pointer maps in the EASE Grid polar projection at two resolutions: 1 km resolution (NPP_DPT1PD_L2GD, NPP_DPT1PN_L2GD),500m (NPP_DPTHPD_L2GD, NPP_DPTHPN_L2GD). It also produces the tiled geolocation angular data at two resolutions in Sinusoidal projection: 1km (NPP_DGA1KD_L2GD, NPP_DGA1KN_L2GD), 500m (NPP_DGAHKD_L2GD, NPP_DGAHKN_L2GD), and in EASE Grid polar projection. The 1 km pointers and geolocation angles are produced in day and night mode.

PGE342 consists of the L2G pointer map process (NPP_PRMGPNTR) that produces the pointers at two resolutions and the tiled geolocation angular data process (NPP_PRMGR) that produces the L2G Geolocation Angles.

6.1.2 Production Rules for NPPDAPS

PGE342 runs in NPPDAPS Recipe NPP_L5m to make SIN Grid products and in
NPPDAPS Recipe NPP_L5mP to make EASE Grid products. These recipes are
executed every day upon the availability of NPP_VMAE_L1 and NPP_VIAE_L1 granules covering the daily processing period. Currently NPPDAPS runs four PGE profiles to produce combinations of day and night mode daily L2G products, combinations of 500m and 1km resolutions, and two grid schemes. The profiles are shown below.

After a full day of PGE01 processing has completed, each PGE342 profile runs once per Land tile per day for NPP_V{M|I}AE_L1 SDR granules containing geolocation associated with Land surface reflectance, surface temperature, fire, and snow in day mode in Sinusoidal projection; once per tile for sea ice data in day mode in EASE Grid polar projection; once per tile for fire in night mode in Sinusoidal projection; and once per tile for sea ice data in night mode in EASE Grid projection. Thus, PGE342 requires four primary profiles to make day mode and night

mode sets of pointers for each resolution and sets of geolocation angles for day mode and night mode.

The four profiles with output products are the following:

Profile 1 Day Mode	Sinusoidal Grid	NPP_DPT1KD_L2GD
		NPP_DPTHKD_L2GD
		NPP_DGA1KD_L2GD
		NPP_DGAHKD_L2GD
Profile 2 Day Mode	EASE Grid	NPP_DPT1PD_L2GD
		NPP_DPTHPD_L2GD
		NPP_DGA1PD_L2GD
		NPP_DGAHPD_L2GD
Profile 3 Night Mode	Sinusoidal	NPP_DPT1KN_L2GD
		NPP_DGA1KN_L2GD
Profile 4 Night Mode	EASE Grid	NPP_DPT1PN_L2GD
		NPP_DPTHPN_L2GD
		NPP_DGA1PN_L2GD
		NPP_DGAHPN_L2GD

PGE342 requires the Latitude/Longitude Tiling Production Rule. To execute PGE342, a Latitude/Longitude tile definition file must be associated with the PGE. The NPPDAPS Loader for PGE342 selects the tiles to be processed. For each individual execution, NPPDAPS will create a recipe instance with a particular Tile ID and pass the Tile ID back to the PGE as a Runtime Parameter.

The activation of any profile of PGE342 is dependent on the availability of at least one granule of the required NPP_V{M|I}AE_L1 geolocation in the associated day and night modes for the processing day. The number of granules overlapping a particular tile for a daily PGE run may be as few as one or even zero. If there are zero granules, the PGE is not run for that tile. For all L2G PGEs requiring the Latitude/Longitude Tiling Production Rule, the Minimum Number of Granules will be set to a default of one.

Day and night modes are run separately in different PGE profiles. To execute one of these profiles of PGE342, the tile scheme must already be associated with the PGE profile. PGE342 profiles will be run for tiles in associated tile schemes. To stage the correct day mode input, a Metadata Based Query Production Rule is used on the geolocation (NPP_V{M|I}AE_L1) granules' metadata attribute DayNightFlag with values of either "Day" or "Both." To stage the correct night mode input, the query retrieves granules with DayNightFlag set to a value of "Night."

The operational scenarios for all profiles of PGE342 range from a maximum of about 360 to 286 land product and 210 sea ice activations for day mode and night mode, representing the processing of one tile per PGE execution. The geolocation angular data process (NPP_PRMGR) is executed

after the L2G pointer map process (NPP_PRMGPNTR) for each profile.

The Production Rules for PGE342 are:

- Period Specification,
- Latitude, Longitude Tiling,
- Metadata Based Query,
- Minimum Number of Granules (defaulted to 1),
- Runtime Parameters

6.1.3 VIIRS Input Products

NPP_VIAE_L1	VIIRS/NPP Imagery Resolution 5-Min L1 Swath SDR 375m
NPP_VMAE_L1	VIIRS/NPP Moderate Resolution 5-Min L1 Swath SDR 750m

6.1.4 External Ancillary Input Products

None

6.1.5 Static Data Inputs

None

6.1.6 VIIRS Output Products

NPP_DPT1KD_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km SIN Grid Day
NPP_DPT1KN_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km SIN Grid Night
NPP_DPTHKD_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m SIN Grid Day
NPP_DGA1KD_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km SIN Grid Day
NPP_DGA1KN_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km SIN Grid Night
NPP_DGAHKD_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 500m SIN Grid Day
NPP_DPT1PD_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km EASE Grid Day
NPP_DPT1PN_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km EASE Grid Night
NPP_DPTHPD_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m EASE Grid Day
NPP_DPTHPN_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m EASE Grid Day
NPP_DGA1PD_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km EASE Grid Day
NPP_DGA1PN_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 1km EASE Grid Night

NPP_DGAHPD_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 500m EASE Grid Day
NPP_DGAHPN_L2GD	VIIRS/NPP Geolocation Angles Daily L2G Global DDR 500m EASE Grid Night

6.1.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>
TileID	<Tile identification number to specify tile within scheme.>

6.2 VIIRS L2G DDR Land Surface Reflection/Fire/Surface Temperature/Vegetation Index (PGE343)

6.2.1 PGE Purpose and Description

PGE343 performs the daily L2G Land Surface Reflectance/Fire/Surface Temperature/Vegetation Index processing at NPPDAPS. PGE343 produces the L2G Land Surface Reflectance products (NPP_DSRF1KD_L2GD, NPP_DSRFHKD_L2GD), the L2G Thermal Anomalies/Fire product (NPP_DVAF1KD_L2G and NPP_DVAF1KN_L2G in day and night mode, respectively), the L2G Surface Temperature products (NPP_DLST1KD_L2GD, NPP_DLST1KN_L2GN in day and night mode, respectively) and the L2G Vegetation Index products (NPP_DRVI1KD_L2G and NPP_DRVIHKD_L2GD).

PGE343 consists of the L2G Land Surface Reflectance/Fire/Vegetation Indices process (NPP_PRMGR). NPP_PRMGR is a general-purpose process that generates L2G Land products, including the surface reflectance, thermal anomalies, surface temperatures, and vegetation indices.

6.2.2 Production Rules for NPPDAPS

PGE343 runs in NPPDAPS Recipe NPP_L5, which is executed every day upon the availability of NPP_V{M|I}AE_L1 granules covering the daily processing period. PGE343 processes the Land Surface Reflectance and the Vegetation Indices at 500 m and 1 km resolutions in day mode. The Thermal Anomalies/Fire and Land Surface Temperatures are processed at 1 km resolution in day and night modes. Metdata queries are made to select granules in day mode, night mode, and both modes.

Tile schemes in the Sinusoidal Projection have been defined and registered in NPPDAPS. PGE343 requires the Latitude/Longitude Tiling Production Rule. To execute PGE343, a Latitude/Longitude tile definition file must be associated with the PGE during registration at NPPDAPS. The NPPDAPS Loader for PGE343 selects the tiles to be processed. For each individual execution, NPPDAPS will create an instantiation of PGE343 with a particular TileID and pass these back to the PGE as Runtime Parameters.

The NPPDAPS production rules are the following:

- Period Specification
- Latitude/Longitude Tiling
- Metadata Based Query
- Minimum Number of Granules (defaulted to 1)
- Runtime Parameters

6.2.3 VIIRS Input Products

NPP_VSRFLMIP_L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 750m
NPP_VSRFLIIP_L2	VIIRS/NPP Surface Reflectance 5-Min L2 Swath IP 375m
NPP_VAFIP_L2	VIIRS/NPP Fire Mask and Qualty Flags 5-Min L2 Swath IP 750m
NPP_VLST_L2	VIIRS/NPP Land Surface Temperature 5-Min L2 Swath EDR 750m
NPP_VRVI_L2	VIIRS/NPP Vegetation Index 5-Min L2 Swath EDR 375m
NPP_DPT1KD_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 1km SIN Grid Day
NPP_DPTHKD_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m SIN Grid Day
NPP_DPTHKN_L2GD	VIIRS/NPP Observation Pointers Daily L2G Global DDR 500m SIN Grid Night

6.2.4 External Ancillary Input Products

None

6.2.5 Static Data Inputs

None

6.2.6 VIIRS Output Products

NPP_DSRF1KD_L2GD	VIIRS/NPP Surface Reflectance Daily L2G Global DDR 1km SIN Grid Day
NPP_DSRFHKD_L2GD	VIIRS/NPP Surface Reflectance Daily L2G Global DDR 500m SIN Grid Day
NPP_DVAF1KD_L2GD	VIIRS/NPP Fire Mask Daily L2G Global DDR 1km SIN Grid Day
NPP_DVAF1KN_L2GD	VIIRS/NPP Fire Mask Daily L2G Global DDR 1km SIN Grid Night
NPP_DLST1KD_L2GD	VIIRS/NPP Land Surface Temperature Daily L2G Global DDR 1km SIN Grid Day
NPP_DLST1KN_L2GD	VIIRS/NPP Land Surface Temperature Daily L2G Global DDR 1km SIN Grid Night

NPP_DVI1KD_L2GD	VIIRS/NPP Vegetation Index Daily L2G Global DDR 1km SIN Grid Day
NPP_DVIHKD_L2GD	VIIRS/NPP Vegetation Index Daily L2G Global DDR 500m SIN Grid Day

6.2.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>
TileID	<Tile identification number to specify tile within scheme.>

6.3 VIIRS L2G DDR Snow Cover (PGE344)

6.3.1 PGE Purpose and Description

PGE344 is the daily L2G Snow Cover process executed at NPPDAPS and produces L2G Snow Cover product (NPP_DSCDHKD_L2GD). PGE344 consists of the daily L2G Snow Cover process (NPP_PRMGR) process. MOD_PRMGR is a general-purpose process that generates L2G Land products including Snow Cover.

6.3.2Production Rules for NPPDAPS

PGE344 runs in NPPDAPS Recipe NPP_L5m, which is executed every day upon the availability of NPP_VMAE_L1 and NPP_VIAE_L1 granules covering the daily processing period. NPPDAPS runs PGE344 for each of the Land tiles configured in the data processing system upon the availability of the NPP_VSCD_L2 granules for the day and after PGE342 has generated the NPP_DPTHKD_L2GD pointer files.

PGE344 runs once per tile per day after L2G Pointers (PGE342) has completed. Since the input NPP_VSCD_L2 data for PGE344 is made only in day mode, the output NPP_DSCDHKD_L2GD will be only in day mode. All input data granules retrieved for the PGE run will have the DayNightFlag set to "Day" or "Both".
PGE344 requires the Latitude/Longitude Tiling Production Rule.

The required inputs for PGE344 are matching granules of NPP_VSCD_L2 and NPP_DPTHKD_L2GD. Using the Metadata Based Query Production Rule, the input granules of NPP_DPTHKD_L2GD are selected for either "Day" or "Both" values of the DayNightFlag. No Metadata Query is needed for the NPP_VSCD_L2 since it is only produced in day mode. The number of granules overlapping a particular tile for a daily PGE run may be as few as one or even zero. If there are zero granules, the PGE is not run for that tile. Thus, for ESDTs input to L2G PGEs requiring the Latitude/Longitude Tiling Production Rule, the Minimum Number of Granules is always set to one.

The NPPDAPS production rules for PGE344 are the following:

- Period Specification,
- Latitude/Longitude Tiling,
- Minimum Number of Granules (defaulted to 1),
- Runtime Parameters

6.3.3 VIIRS Input Products

NPP_VSCD_L2 VIIRS/NPP Snow Cover 5-Min L2 Swath EDR 750m
NPP_DPTHKD_L2GDVIIRS/NPP Observation Pointers Daily L2G Global DDR 500m SIN Grid Day

6.3.4 External Ancillary Input Products

None

6.3.5 Static Data Inputs

None

6.3.6 VIIRS Output Products

NPP_DSCDHKD_L2GD VIIRS/NPP Snow Cover Daily L2G Global DDR 500m SIN Grid Day

6.3.7 Dynamic Runtime Parameters

SatelliteInstrument	<Spacecraft platform for VIIRS instrument supplied by NPPDAPS; Valids {NPP, N01, … }.>
ProcessingEnvironment	<Computer machine environment obtained via system call; such as “IRIX64 modular 6.5 011 001245 IP27”.>
CollectionStartTime	<Start day and time for data observations.>
CollectionEndTime	<End day and time for data observations.>
PGEVersion	<Version of PGE that is set in the PGE script.>
TileID	<Tile identification number to specify tile within scheme.>

APPENDIX A - ACRONYMS

ADP	Ancillary Data Provider
ADS	Archive and Distribution Segment
AFWA	Air Force Weather Agency
API	Application Programming Interface
ARP	Application Related Product
ATMS	Advanced Technology Microwave Sounder
AVHRR	Advanced Very High Resolution Radiometer
BRDF	Bidirectional Reflectance Distribution Function
C3S	Command Control and Communication Segment
CLASS	Comprehensive Large Array-data Stewardship System
CDR	Climate Data Record
CPU	Central Processing Unit
COTS	Commercial-Off-The Shelf
CrIS	Cross-Track Infrared Sounder
CV MVC	Constrained View Maximum Value Composite
DAAC	Distributed Active Archive Center
DB	Database
DDR	Data Delivery Report
DDR	Diagnostic Data Record
DN	Delivery Notice
DOD	Department of Defense
EDR	Environmental Data Record
EDRIR or EDR-IR	EDR Interdependency Report
EOS	Earth Observing System
EVI	Enhanced Vegetation Index
FTP	File Transfer Protocol
HDF	Hierarchical Data Format
I&TSE	Integration and Test System Element
IDPS	Interface Data Processing Segment
IM	Imagery (band)
IP	Intermediate Product
IPO	Integrated Program Office
IR	Infrared
ISF	Integrated Support Facility
L0	Level 0 (product)
L1	Level 1 (product)
L2	Level 2 (product)
L2G	Level 2 Gridded (product)
L3	Level 3 (product)
L4	Level 4 (product)
LAADS	Level 1 and Atmosphere Archive Distribution System
LDOPE	Land Data Operational Product Evaluation
LP	Land PEATE
LSS	Launch Support Segment

LWIR	Longwave Infrared
MOD	Moderate (band)
MODIS	Moderate Resolution Imaging Spectroradiometer
MODAPS	MODIS Adaptive Processing System
MWIR	Midwave Infrared
NAAPS	NRL Aerosol Analysis & Prediction System
NASA	National Aeronautics and Space Administration
NBAR	Nadir BRDF Adjusted Reflectance
NDVI	Normalized Difference Vegetation Index
NESDIS	National Environmental Satellite Data Information Service
NEXT	NPP Engineering development unit eXchange Toolkit
NGST	Northrup Grumman Science Team
NICSE	NPP Instrument Calibration Support Element
NIR	Near Infrared
NOAA	National Oceanic and Atmosphere Administration
NOSA	NOAA Observatory System Architecture
NPOESS	National Polar-Orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Project
NPPDAPS	NPP Data Processing System
NRL	Naval Research Laboratory
NSIPS	NPOESS Science Investigator-led Processing System
OLS	Operational Linescan System
OMPS	Ozone Mapping and Profile Suite
OPS	Operations (code)
PCF	Process Control File
PEATE	Product Evaluation and Test Element
PGE	Product Generation Executive
PSOE	Project Science Office Element
RDR	Raw Data Record
SCI	Science (code)
SD3E	Science Data Segment Data Distribution and Depository Element
SDR	Sensor Data Record
SDS	Science Data Segment
ST	Science Team
SVN	Subversion
SWIR	Shortwave Infrared
TB	Terabytes
TBD	To Be Determined
TOA	Top of Atmosphere
TOC	Top of Canopy
VI	Vegetation Index
VIIRS	Visible Infrared Imaging Radiometer Suite
VIS	Visible

APPENDIX B – REQUIREMENTS TRACEABILITY

Table B-0-1 Requirements Traceability Matrix

NPP Science Data Segment Requirements Specification	Description of Land PEATE and its NPPDAPS Production System Support	Land PEATE Science Data Processing Software System Description
2.4	Extract the data of interest into its system for xDR quality evaluation, selected subset processing, and algorithms enhancement.	3.1, 3.8, 3.8.1. 3.8.2, 3.8.4, 3.8.5
2.4	Interface with the I&TSE in order to further validate the performance of the recommended algorithm enhancement.	3.1, 3.8.1
2.4	Coordinate calibration evaluation and validation with the NICSE.	3.1, 3,8,7
2.4	Submit calibration enhancements and recommendations to PSOE.	3.1, 3,8
2.4	Receive ancillary data, operational calibration updates, and algorithm source code for generation of data products from ADS.	3.1, 3.8.5, 3.8.7
2.4	Work closely with the Science Team to achieve their objectives.	3.1, 3.4.4, 3.4.5, 3.8.4, 3.8.7, 3.8.8, 3.9
3.4	Ingest data from SD3E, ADS, and NEXT.	3.1, 3.4.3, 3.8.5
3.4.2.1	Store/catalog data needed for EDR evaluation.	3.6
3.4.3	Manage software configuration	3.6
3.4.4	Process science data.	3.8, 3,8,1, 3.8,4, 3.9
3.4.4.4	Receive Cal LUTs from NICSE.	3.8.1
3.4.4.14	Generate SDRs.	3.8, 3.8.1, 3.8.4, 5.1, 5.2
3.4.4.15	Generate EDRs.	3.8, 3.8.1, 3.8.4, 5.3 - 5.33
3.4.4.16	Support Science Team in development and generation of test data	3.4, 3.4.1 – 3.4.5, 3.8.2, 3,8,4, 3.10
3.4.4.20	Document software developed in course of mission.	3.6
3.4.5	Export data.	3.8.8
3.4.5.2	Permit the Science team to place standing orders for xDRs and ancillary data stored in the PEATE.	3.8.8
3.4.5.3	Push science data to Science Team members.	3.8.8

APPENDIX C – ASSUMPTIONS FOR VERSION 1.2 LAND PEATE DOCUMENT

1. The Operational Code that is run by IDPS will match the code as described in the EDR Interdependency Report (EDRIR) REV. A Draft 15, June 30, 2006.
2. The PGE descriptions in Version 1.2 of the Land PEATE VIIRS Science Processing Software System Description document are based on the Operations Code as described in the EDRIR, Rev. A, Draft 15, June 30, 2006. Any discrepancies among the NGST Science Code obtained by the Land PEATE Integration Team from NEXT or CasaNOSA for the Prototype System, the 2007 Operations Code, and the EDRIR are documented by comments in the PGE descriptions and PGE/product tables as appropriate.
3. The L1 SDRs exported to NPPDAPS from IDPS via CLASS/NESDIS Central, ADS, and/or SD3E will be packaged separately into Imagery Resolution Bands (375m), Moderate Resolution Bands (750m), and the Day/Night Band. The L1 Geolocation IPs from IDPS will match this packaging of the SDRs. Otherwise, NPPDAPS will re-package on ingest of the data.
4. The Level 0, Level 1, and Level 2 data files exported to NPPDAPS from IDPS via CLASS/NESDIS Central, ADS, and/or SD3E will cover a corresponding data collection period of 5 minutes per file. Otherwise, NPPDAPS will re-package on ingest of the data.
5. VIIRS data, external ancillary data, and other informational files will be archived or stored at NPPDAPS for a minimum of a 32-day period corresponding to the SD3E 32-day window for import of data to NPPDAPS. Only the data needed to make the 17-day, quarterly, monthly, and yearly products will be archived at NPPDAPS for as long as the Land PEATE requires to generate the products, use the products as inputs to PGEs, validate products, and make recommendations to the NPP Project for improvements in the VIIRS science data and corresponding software.
6. CLASS/NESDIS Central will provide ancillary data to NPPDAPS primarily consisting of NCEP ancillary data. NPPDAPS will use only these provided data for the NCEP GFS 750m Granulation PGE. The alternate NOGAPS ancillary data that are listed in the Production Rule files for some of the PGEs will only be used if these data are provided by CLASS when NCEP data are missing for a 6-hour time period. The format of the NCEP and NOGAPS data is the same and the data appears to be the same, with the exception that the Total Column Ozone is missing from the NOGAPS data. CLASS/NESDIS Central will also provide the NAAPS ancillary data.
7. NPPDAPS will run the NCEP GFS 750m Granulation PGE for each 6-hour period before the Level 2 PGEs requiring

the granulation swaths at 750m are run. All of the parameters that are needed by the PGEs will be stored in separate files.

8. NPPDAPS will perform the continuous gridding of VIIRS products using post-processing, VIIRS Gridding IP PGEs after the input Level 2 VIIRS swaths of data are available as input to these PGEs and before the VIIRS gridded IP data are required for the next round of granulation for new swaths of SDR data.
9. NPPDAPS will run the VIIRS Gridded IP 750m Granulation PGE and the VIIRS Gridded IP 375m Granulation PGE for each 5-minute period after the SDR swath for that period has been generated and before the Level 2 PGEs requiring the granulation swaths at 750m and 375m are run. All VIIRS gridded IP products for which a granulation is required will be input to the appropriate PGEs.
10. The VIIRS L3 gridded, tiled IPs from IDPS will be aggregated at NPPDAPS into MODIS-size tiles for use in the Land PEATE processing and analysis. The DDR tiles generated by the Land PEATE will also be MODIS-sized for comparison to IDPS VIIRS products and MODIS products.

APPENDIX D - PRODUCTION RULES AVAILABLE FOR PGES IN NPPDAPS

D.1 Temporal

1. Basic Temporal: Activation based on start date/time and end date/time for output data.
   Assumptions: Input data temporal range matches output data temporal range.
   Requires: Specification of output data temporal range.
   Specification of processing start date/time (i.e., start date/time of the period of processing based on the frequency of data availability).
   PGE Levels and Types: L1 5-Minute, L2 5-Minute

2. Advanced Temporal: Activation based on start date/time and end date/time of output data with either start or end for input offset by deltas applied to the output data temporal range.
   Assumptions: The delta value may be positive or negative; a negative delta value applied to date/time would move the date/time back (earlier); a positive delta value applied to date/time would advance the date/time forward (later). Thus to extend both start and end boundaries, a negative delta would be applied to the start and a positive delta to the end. Granules in a delta range that is extended beyond the original Production Request specification usually have an associated availability time-out at which the Data Processing System is instructed to fail the PGE instance or to treat the input ESDTs as optional and run without them. For specific input ESDTs, the delta values may be expressed as a number of additional files at each end of the output data temporal range.
   Requires: Specification of data range for the processing period.
   Specification of start and stop temporal boundary deltas or corresponding numbers of files.
   PGE Levels and Types: L1 5-Minute, L2 5-Minute, L2G Daily, L3 Daily, L4 Daily, L3 8-Day, L4 8-Day, L3 16-Day, L4 16-Day, L3 17-Day, L4 17-Day, L3 Monthly, L4 Monthly, L3 96-Day, L4 96-Day

3. Nearest Temporal Match (Closest Granule): Request and staging of the nearest input granule of an ESDT from the Data Processing Request time. The Data Processing System will search either forward or backward in time

for a specified period of time until it finds a granule that matches the request.

Assumptions: Rule is implemented with a wait time for re-tries if no file is found.

Requires: Specification of length for time period of the search for the query.
Direction of search, forward in time or backward in time or both.

PGE Levels and Types: L2 5-Minute

D.2 Orbit

Orbit-Based: Activation is by orbit (PGE is scheduled per orbit) or by its associated time range. The orbit numbers and corresponding temporal ranges are maintained in an internal table and the temporal range of the input and output data for a specific PGE instance is determined by a Look-up-table.

Assumptions: The PGE will not be activated without availability of all granules for an orbit. The internal orbit number table will be updated frequently so that the data may be associated with an orbit as they become available. This production rule is usually accompanied by the Minimum Number of Granules Production Rule with associated wait times.

Requires: Specification of orbit number range in the Production Request.

PGE Levels and Types: L2 5-Minute

D.3 Periodic

1. Period (Calendar) Specification: Activation is for a specified calendar period (day, week, month, or year)

   Assumptions: The PGE will not be activated without availability of all granules for the period to be run. This production rule is usually accompanied by the Minimum Number of Granules Production Rule with associated wait times.

   Requires: Specification of start and end for the production request.

   PGE Levels and Types: L2G Daily, L3 Daily, L4 Daily, L3 Monthly, L4 Monthly, L3 Yearly, L4 Yearly

2. Period Start_of_(N)_Days: Activation is for a selected period/cycle. The rule may be thought of as Start_of_Year for a period of N days rule.

   Assumptions: Periods are calculated based on the beginning of the year by default. The PGE will not be activated without availability of all granules for the period to be run. This production rule is usually accompanied by the

Minimum Number of Granules Production Rule with associated wait times.

Requires: Specification of start and end for the production request.
Specification of the duration of the period when the PGE is registered or installed. If the period is not to be based on start-of-calendar year for beginning the calculation, a start date/time for the cycle must also be specified.

PGE Levels and Types: L3 8-Day, L4 8-Day, L3 16-Day, L4 16-day, L3 17-day, L4 17-Day, L3 32-Day, L4 32-day, L3 96-Day, L4 96-Day

3. Smart Start of Year: Activation at the beginning of a new year resets the start of the selected period for production to the start of year as a default. Smart Start of Year has a option of inclusion of data from the next year at the last period of the year or allowing the last period of the year to have fewer days included in the products.

Assumptions: For a PGE using one of the Period Start_of_N_Days Production Rules, an end-of-year processing period which spans the beginning of the new year will complete by either including data processed for the new year up to the end of the period or by including only data processed for the end of the current year. The effective reset to start of year for the cycle results in redundant inclusion of any data from the new year that have been included in the last period of the previous year.

Requires: Specification of the values of "N" in the Period Start_of_N_Days and specification of whether days from the next year are to be included in the last period of the year or not included.

PGE Levels and Types: L3 8-Day, L4 8-Day, L3 16-Day, L4 16-Day, L3 17-Day, L4 17-Day, L3 32-Day, L4 32-Day, L3 96-Day, L4 96-Day

D.4 Tiling

1. Latitude/Longitude Tiling: Activation is based on a tile specified in the Tile Definition File that contains the Tile ID and the Latitude/Longitude of the Tile Corners. The Tile ID may be passed back to the PGE as a runtime parameter and inserted in the PCF.

Assumptions: The PGE will be activated after a specified query delay time for the specified tile if there are any input granules available or if a minimum number is specified during registration or installation of the PGE. The

PGE may make use of Minimum Number of Granules Production Rule, but the default is one granule.

Requires: Specification by the Data Processing System of the Tile ID for the tile to be processed or specification of the Latitude/Longitude from which the Tile ID may be determined.

PGE Levels and Types: L2G Daily, L3 Daily, L4 Daily, L3 8-Day, L4 8-Day, L3 16-Day, L4 16-Day, L3 17-Day, L4 17-Day, L3 Monthly, L4 Monthly, L3 32-Day, L4 32-Day, L3 96-Day, L4 96-day, L3 Yearly, L4 Yearly

2. Zonal Tiling: Activation is based on a Zone Definition File that contains the Latitude coordinates which bound the Zonal tile. The Latitude coordinates designate a zone extending around the Earth.

   Assumptions: The PGE will not be activated without availability of all granules for the specified tile or a minimum number as specified during registration or installation of the PGE. The PGE may make use of Minimum Number of Granules rule.

   Requires: Specification of the Zonal Definition File for the zone to be processed or specification of the Latitudes from which the zone can be determined.

   PGE Levels and Types: L3 Daily

D.5 Additional Inputs

1. Alternate Inputs: Activation is based on a hierarchy of choices of input files of a specified ESDT (first choice, second choice, etc.).

   Assumptions: The PGE will not be activated unless one of several alternate inputs is available. One input is considered to be "primary" input. Each input has an associated time-out such that if the input is not available within the time-out period, processing will wait for the next alternate through its time-out period, and so on. If the primary input or a higher priority alternate becomes available during the wait period for a lower priority alternate, the PGE will be activated with the available primary input or higher priority alternate if that is the one that becomes available first. For most PGEs the last alternative is a static climatological file which is always available on the Data Processing System.

Requires: Specification of each alternate, the preference order, and a time-out for each input.
Specification of the first alternate as the primary.
Specification of the category which groups the alternates and the runtime parameter which identifies which input is available.
PGE Levels and Types: Ancillary Data Preprocessing

2. Optional Inputs: Activation is based on availability of one or more specified Optional Inputs of a specified ESDT within a time-out period, after which the PGE is activated without the Optional Inputs.
Assumptions: The PGE will not be activated until the time-outs have expired for the Optional Inputs. The PGE will be activated at that time without any of the Optional Inputs. The time-out for the Optional Inputs begins only after the required inputs are known to be available. The time-outs for multiple Optional Inputs are concurrently "counted down."
Requires: Specification of each optional input, a time-out for each input (optional), and a runtime parameter for each input to identify which input is available.
PGE Levels and Types: L1 5-Minute, L2 5-Minute, L4 8-Day, L4 16-Day, L3 32-Day, L3 96-Day, L4 Yearly

D.6 Metadata-Based Query and Activation

1. Metadata-Based Query: The Data Processing System queries its Databases to determine which granules of each required input ESDT are available. Activation is based on results of this query of metadata attributes of each specified ESDT for available granules that meet the query criteria.
Assumptions: The metadata attributes on which the Metadata-Based Query is to be made are already in the processing system's database at the time the PGE instances are scheduled. Associated wait times for specific input ESDTs are also already in the database.
Requires: Specification of all metadata attributes for all input ESDTs to be used for the Metadata-Base Query.
Specification of associated wait times for availability of granules of each ESDT to meet the Metadata-Based Query.
PGE Levels and Types: L2G Daily, L3 Daily, L3 8-Day, L3 96-Day

2. Metadata -Based Activation: Activation is conditional based on metadata values of a single input data granule of an ESDT. If the expected granule for this data processing period has the required metadata values, the PGE is executed; if not, the PGE is not executed.

Assumptions: The metadata attributes on which the Metadata-Based Activation is to be made are already in the processing system's database at the time the PGE instances are scheduled.
Requires: Specification of all metadata attributes for the input ESDT to be used for the Metadata-Based Activation.
PGE Levels and Types: L2 5-Minute

D.7 Mimimum Number of Granules

Minimum Number of Granules: Activation is conditionally based on availability of a minimum number of data granules of a specified ESDT.
Assumptions: The PGE instance has at least one required input ESDT but will run without the full set of input granules of that type for the time span of the data processing period. The quality of the output granules may be reduced by running with fewer than the full set of input granules, but the quality is still good enough if at least a minimum number of input granules are available.
Requires: Specification of the time span of the data processing period for which the input granules are required so that the Data Processing System can determine the number of granules expected in the full set for the ESDT.
Specification of the minimum number of input granules of each ESDT that will ensure an acceptable quality of the output products.
PGE Levels and Types: L2 5-Minute, L2G Daily, L3 Daily, L3 8-Day, L4 8-Day, L3 16-Day, L4 16-Day, L3 Monthly, L3 32-Day, L3 96-Day, L3 Yearly, L4 Yearly

D.8 Run-Time Parameters

Runtime Parameters: PGEs make use of two types of Runtime Parameters, Static and Dynamic. Dynamic Runtime Parameters are determined by the Data Processing System and passed to the PGE scripts at runtime. These are put into the instantiated PCF by the PGE script. Static Runtime Parameters are associated with the installed versions of the PGEs. These are either embedded in the PGE script or the PGE code. If they are in the PGE script, it inserts them into the instantiated PCF.

Assumptions: The Dynamic Runtime Parameters are determined by the Data Processing System and passed to the PGE script at runtime. The Static Runtime Parameters are known to the PGE script or to the PGE itself.
Requires: The Data Processing System passes the Runtime Parameters to the PGE instances.
The PGE script builds the instantiated PCF and inserts the relevant Runtime Parameters into the PCF.
PGE Levels and Types: L2 5-Minute, L2G Daily, L3 Daily , L4 Daily, L2 8-Day, L4 8-Day, L3 16-Day, L4 16-Day, L3 Monthly, L3 32-Day, L3 96-Day, L3 Yearly, L4 Yearly

D.9 File Update

File Update: A Production Rule allowing files to be staged for updating by PGEs and archived when the PGE has completed its run is provided by NPPDAPS.
Assumptions: The Data Processing System ensures that the planning and scheduling is performed such that the update files will be created by the PGEs on the day required and that they will be available for subsequent runs of PGEs. If any there is any order in which a PGE must run, this order will be correctly performed. The update file is opened with modify access by the PGEs.
Requires: The file to be updated is available online for the PGEs that read and write to it at the time the PGE is scheduled for execution.
The Data Processing System keeps track of the file and ensures that it is updated by subsequent PGE runs in the correct order specified in the Production Rule.
The Data Processing System allows only one PGE instance to update the file at any one time.
PGE Levels and Types: L3 Daily, L4 Daily, L4 8-Day, L4 Yearly