NPP VIIRS Land PEATE

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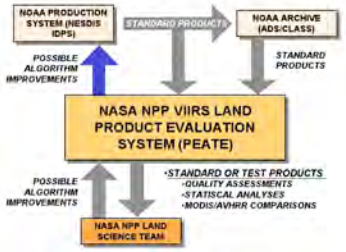
NASA Goddard Space Flight Center, Code 614.5

1 Overview

- The NPOESS Preparatory Project (NPP) VIIRS Land Product Evaluation and Algorithm Test Element (PEATE) supports the NPP Science Team in assessing the utility of NPP Land Environmental Data Records (EDRs) for climate research
- Land PEATE builds upon the MODIS approach and infrastructure for science team support, product generation and quality assessment
  - VIIRS product generation software runs in MODAPS
  - Gridded (Level 3) products (Diagnostic Data Records) facilitate comparison with MODIS products and ground-truth
  - Products available online for Science Team evaluation
  - LDOPE (Land Data Operational Product Evaluation) team works with Science Team in evaluating product quality
- Land PEATE supports CERES on NP with reprocessing of VIIRS SDR and Aerosol products

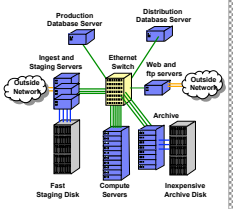
2 Evaluating and Improving Products



The Land PEATE works with the NPP Land Science Team to assess the quality of VIIRS products produced in the IDPS at NESDIS and to test improved algorithms provided by the Science Team for possible use for operational product generation.

3 Land PEATE built upon MODAPS

- Land PEATE uses MODAPS software for processing and distribution
- Databases schedule, track and control jobs
- Scalable clusters of inexpensive Intel-based servers running open source software (Linux, Apache, Perl)
- Current small system, 16 servers and 20TB storage runs VIIRS SCI and OPS software and Science Team updates for Surface Reflectance and Fire.



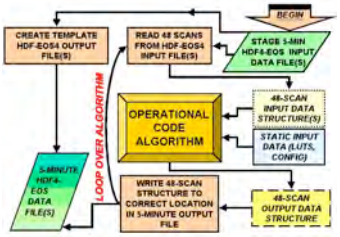
4 OPS (Operational) software

- Runs in Interface and Data Processing Segment (IDPS)
- Runs on IBM multi-processor servers under AIX
- Written in C++ with most data transfers through memory
- Archived products are written in HDF 5
- Software deliveries
  - Build 1.4 3/23/07 Preliminary algorithms with MODIS Collection 3 heritage
  - Build 1.5 10/30/07 update most algorithms to Coll. 4 / Coll. 5 MODIS plus fixes from chain testing
  - Build 1.5.x1 1/30/09 update remaining algorithms and LUTs
  - Build 1.5.x2 4/30/09 final updates to LUTs plus patches

5 Adapting OPS code to run in MODAPS

Wrapper+Aggregator software enable:

- OPS code to run in MODAPS [Wrapper]
- All products to be read and written as HDF 4-EOS (MODIS format) 5 minute granules [Aggregator]



6 Sources of Data

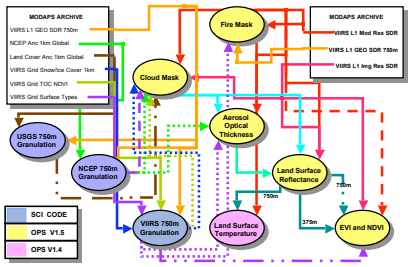
- Pre-Launch Test Data
  - Proxy data - MODIS Terra or Aqua L1B data mapped to nearest VIIRS band with mapping to VIIRS scan geometry. Produced by a revised version of SDRgen.
  - Proxy data –converted to raw instrument packets and played back through the system to test SDR production software
  - Data from instrument testing
- Post-Launch Data
  - VIIRS RDR, SDR, EDR, IPs from SD3E, NSIPS and CLASS (occasionally)
  - MODIS products from MODAPS/LAADS for comparison with VIIRS SDR, EDRs and DDRs

7 Testing Improved Algorithms

- Science Team may modify OPS code and/or LUTs or deliver entirely new science software
- Modified software will run in a series of science tests producing EDRs and DDRs for comparison with MODIS products
- LDOPE will perform visual and statistical evaluation of tests
- Issues identified on a product by product basis are posted on Land PEATE Q/A web site at:

http://landweb.nascom.gov/NPP

8 May 2008 Software Testing



9 Documenting Q/A Issues

- Each product quality issue is identified with a case number and is labeled as pending, closed or as note.
- Detailed description on the issue can be obtained by clicking on the case number
- If an issue has been fixed in a following algorithm version, the issue is labeled closed.
- If an issue is related to problem in input data or an upstream algorithm then the issue is labeled as a Q/A note.

10 Integrating Build 1.5 Software*

Software	Status
Fire Mask	Completed
Cloud Mask	Completed
Aerosol Optical Thickness	Completed
Surface Reflectance	May
Vegetation Index	May
Land Surface Temperature	June
Aerosol Particle Size, Suspended Matter	June
Surface Type	June
Land Surface Albedo	July
Cloud Optical Properties	July
Snow	July
Sea Ice Characterization, Ice Surface Temp.	August

* Build 1.4 version already running for all these products

11 New work in Build 1.5* and DDRs

Software	Status
RDR-SDR-GEO Code	June-July
OPS Granulation/Gridding Wrapper	June-July
Granulation to Gridding Routines	July
Gridding to Gridding Routines	August
Adapt MODIS L2g to VIIRS geometry	Completed
VIIRS L2g pointers and L2g geo-angles	Completed
Daily Surface Reflectance, Fire and Snow DDR	Completed
8-day Surface Reflectance, Surface Temperature, Snow and Fire	June-Sept
16-day BRDF/Albedo, VI	October
96-day Surface Type	December

* No version of OPS code running for these products

12 Where we are in 2008

- Land PEATE systems running both OPS code (operational software from IDPS Builds) and science algorithms updates from NPP Science Team members on a small system for testing purposes
  - PEATE begin integrating Build 1.5 (at-launch) software in November 2007 will finish in December 2008
  - MODIS Level 2g software has been adapted to produce VIIRS gridded data sets (DDRs) to use in comparisons with MODIS Land products
- LDOPE quality assessment team has posted "known issues" from chain testing of VIIRS OPS code on the VIIRS Land Q/A web site at: http://landweb.nascom.nasa.gov/NPP
- Land PEATE interface testing with other elements of the SDS will occur over the Summer
- Determine if there are data sets Science Team would like Land PEATE to host to support product evaluation
- Working with CERES team to provide VIIRS products for CERES processing

13 Milestones in 2009

- Additional power installed in computing facility for Land PEATE and MODIS servers and storage - August 2008
- 200TB of storage and 40 compute servers installed to support pre-launch tests – October 2008
- Upgrade to mission network bandwidth to support MODIS and NPP – December 2008
- Launch-ready build of Land PEATE software (Build 3) completes testing - March 2009
- Functional thread tests (ingest XDRs, validate XDRs, support Calibration) - June 2009
- "Day in the Life" test with all elements of the NPP SDS - January 2010
- Work with Science Team to get ready for post-launch product evaluation