STATUS OF LEVEL 2 PRODUCTS

AIRS TEAM MEETING

November 2001

JOEL SUSSKIND

ACCOMPLISHMENTS SINCE LAST TEAM MEETING

LEVEL 2 PROBLEM "SOLVED" ON GSFC SYSTEM USING JANUARY 2001 VERSION OF THE DECEMBER 15, 2000 DATA SET

- RESULTS SHOWN IN DATA ASSIMILATION WORKSHOP TALK
- SMALL NEGATIVE BIAS STILL EXISTS IN WINDOW CLEAR COLUMN RADIANCES AND SURFACE SKIN TEMPERATURE

ALL UPGRADES TO CODE WERE INSTALLED IN JPL PGS

"CONVERGENCE" STUDY SHOWS ONLY VERY SMALL DIFFERENCES IN GSFC AND JPL RESULTS FOR ONE CASE STUDIED AFTER DISCREPANCIES IN METHODOLOGY AND SMALL BUGS WERE FIXED

- SMALL DISCREPANCY STILL EXISTS IN TREATMENT OF STRATOSPHERIC TEMPERATURE SOUNDING CHANNELS
- NEEDS FURTHER WORK DONE ON A CURRENT LARGE DATA SET (SIZE OF GRANULE 401)
- CONVERGENCE TESTING SHOULD BE DONE WITH CURRENT RETRIEVAL SYSTEM TESTS WERE DONE USING A FROZEN EARLIER VERSION

JPL SYSTEM TESTED ON SEPTEMBER 2001 VERSION OF DECEMBER 15, 2000 DATA SET

MOST SIGNIFICANT CHANGES TO THE RETRIEVAL SYSTEM

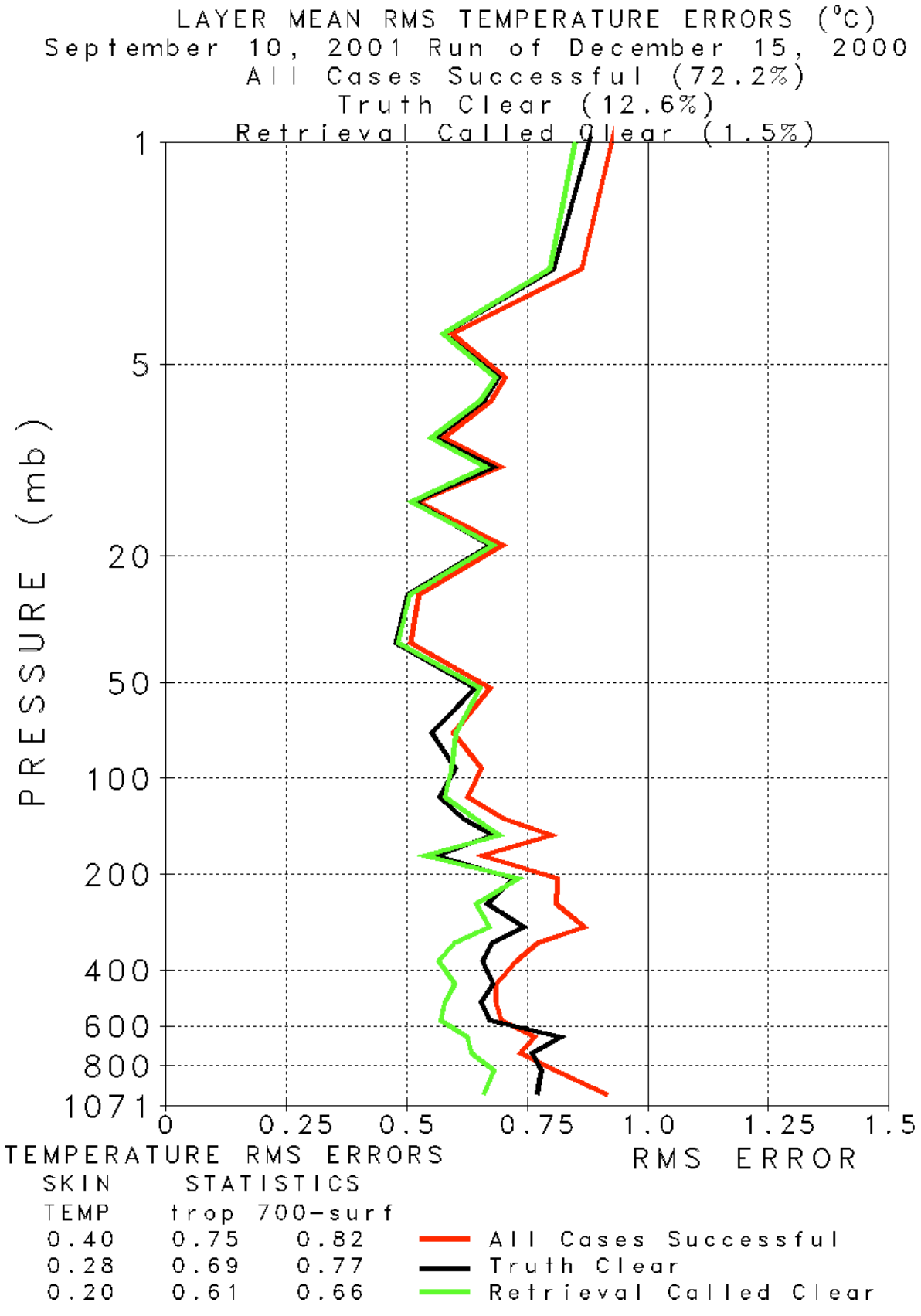
CHANGES IN SKIN TEMPERATURE RETRIEVAL STEP

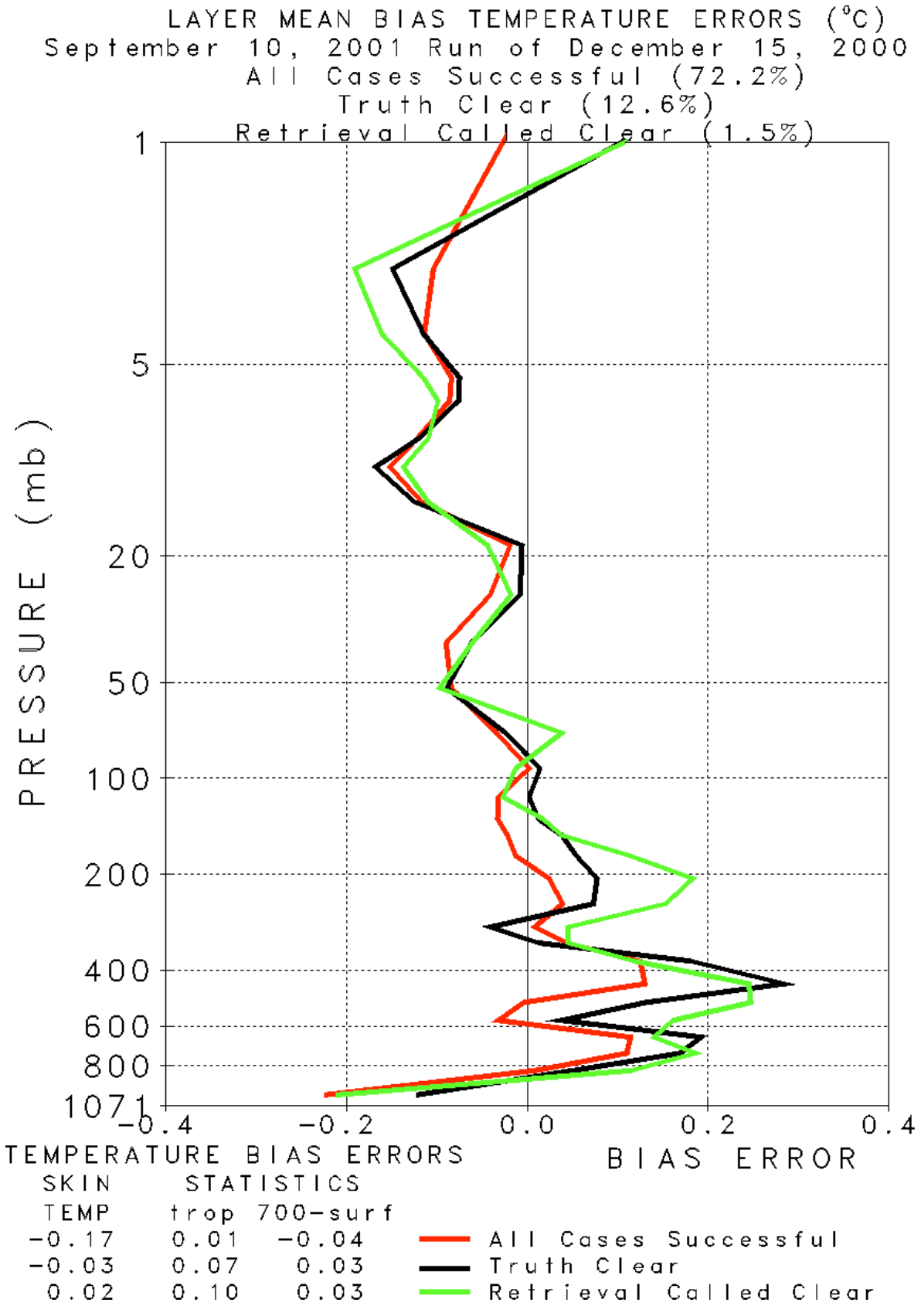
- START WITH FIRST PRODUCT INITIAL GUESS FOR T_S IN SECOND PASS RETRIEVAL

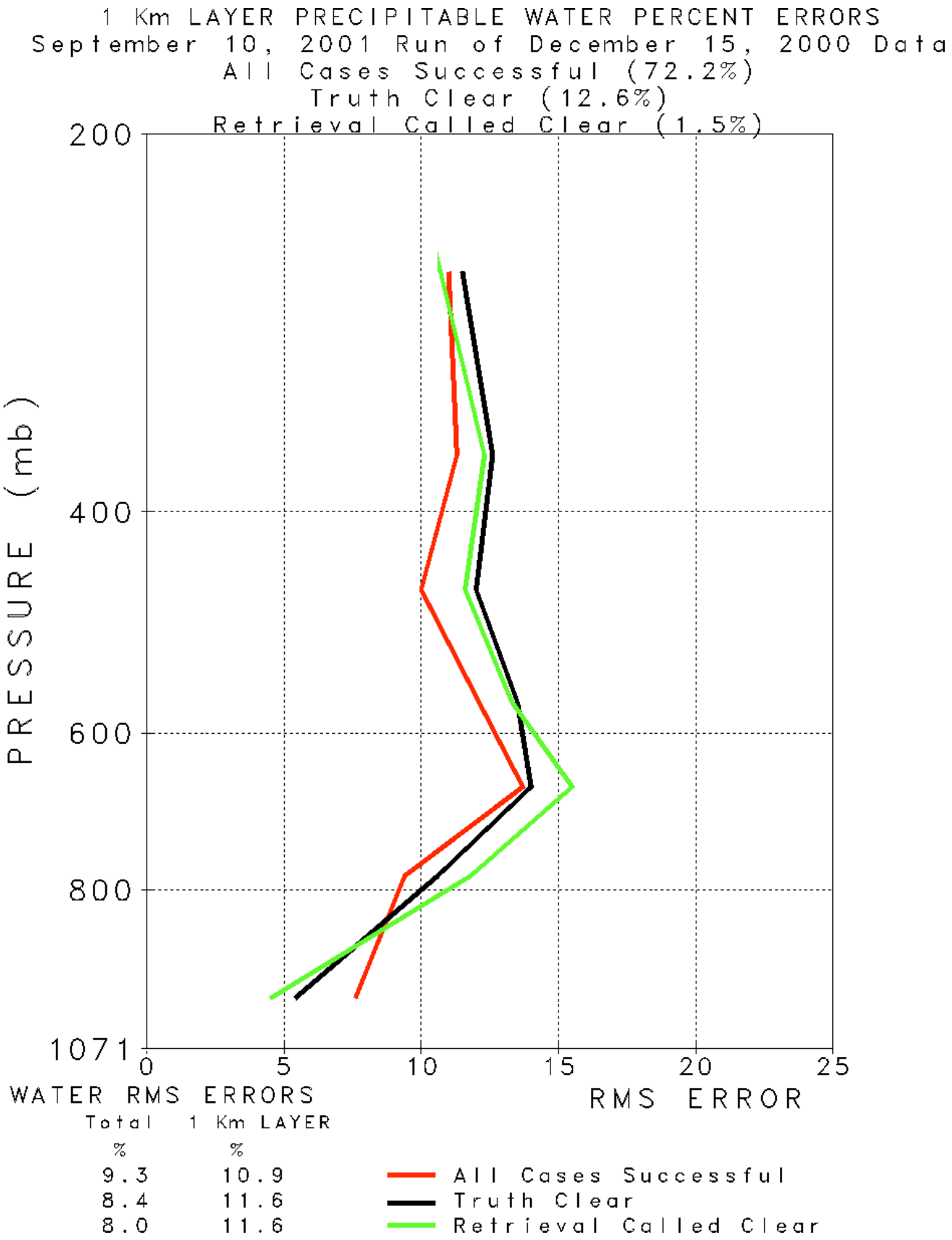
RATHER THAN FIRST PASS T_S RETRIEVAL
INCLUDE A SHIFT OF TEMPERATURE PROFILE IN SKIN TEMPERATURE RETRIEVAL

IMPROVE REJECTION CRITERIA
UTILIZE EFFECTIVE NOISE AMPLIFICATION FACTOR THRESHOLD
TAKES INTO ACCOUNT PREDICTED UNCERTAINTY IN CLEAR COLUMN RADIANCES ARISING FROM UNCERTAINTY IN ⌊⌋
HIGH VALUES OF EFFECTIVE NOISE AMPLIFICATION FACTOR INDICATE ILL-CONDITIONED CLOUD CASES

BLEND FIRST PRODUCT AND MICROWAVE PRODUCT TEMPERATURE PROFILES BENEATH 300 MB TO PRODUCE FIRST GUESS FOR TEMPERATURE PROFILE RETRIEVAL
DEGREE OF BLENDING IS BASED ON EFFECTIVE NOISE AMPLIFICATION FACTOR
ALL FIRST PRODUCT IF LESS THAN 2.5
ALL MICROWAVE PRODUCT IF MORE THAN 4.0

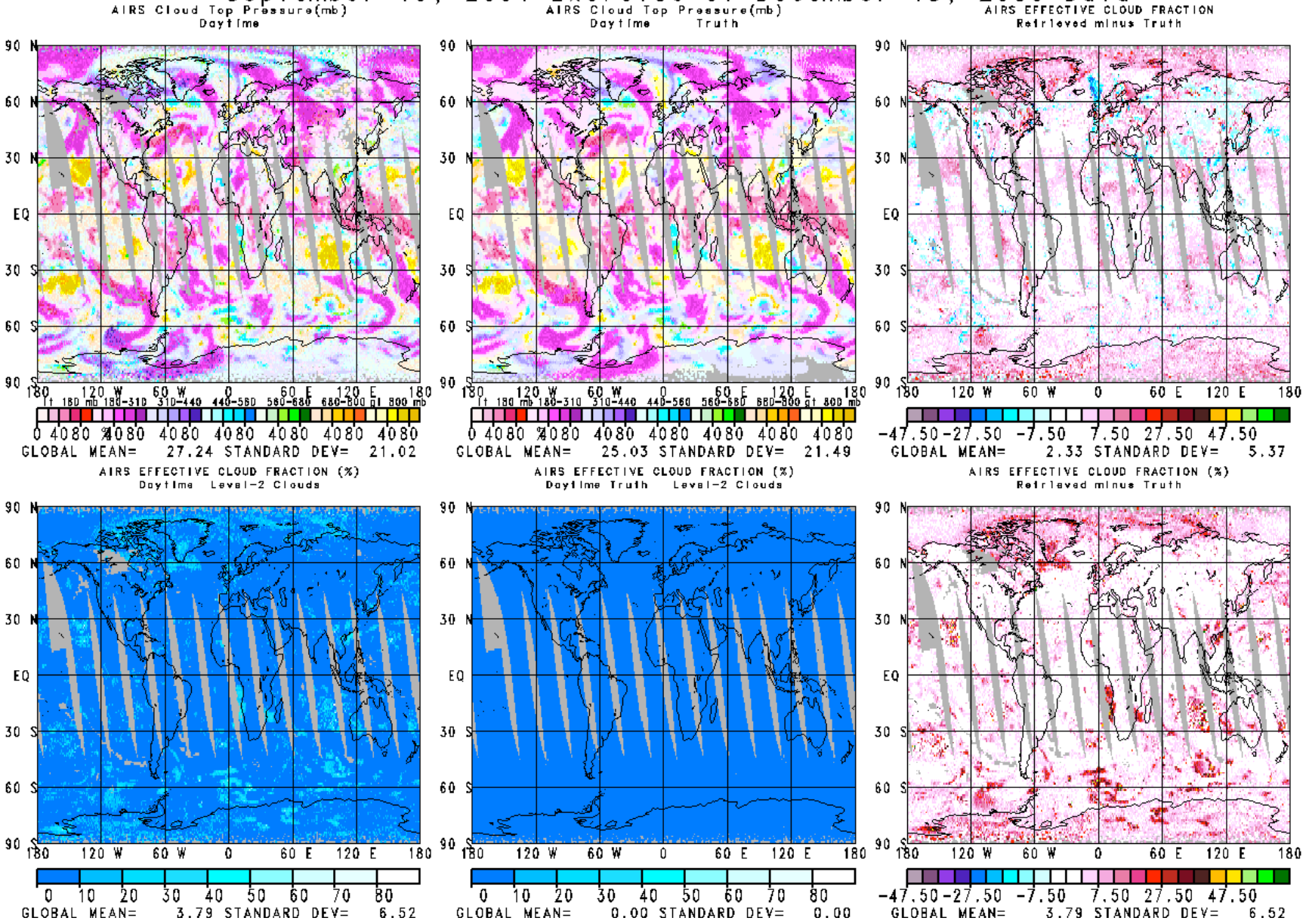

LAYER MEAN RMS TEMPERATURE ERRORS (°C)
September 10, 2001 Run of December 15, 2000 Data
All Cases Successful (72.2%)
Truth Clear (12.6%)
Retrieval Called Clear (1.5%)
PRESSURE (mb)
1
5
20
50
100
200
400
600
800
1071
0
0.25
0.5
0.75
1.0
1.25
1.5
RMS ERROR
TEMPERATURE RMS ERRORS
SKIN STATISTICS
TEMP trop 700-surf
0.40 0.75 0.82
0.28 0.69 0.77
0.20 0.61 0.66
All Cases Successful
Truth Clear
Retrieval Called Clear


LAYER MEAN BIAS TEMPERATURE ERRORS (°C)
September 10, 2001 Run of December 15, 2000 Data
All Cases Successful (72.2%)
Truth Clear (12.6%)
Retrieval Called Clear (1.5%)
PRESSURE (mb)
1
5
20
50
100
200
400
600
800
1071
−0.4
−0.2
0.0
0.2
0.4
BIAS ERROR
TEMPERATURE BIAS ERRORS
SKIN TEMP
STATISTICS
trop
700−surf
−0.17 0.01 −0.04
−0.03 0.07 0.03
0.02 0.10 0.03
All Cases Successful
Truth Clear
Retrieval Called Clear


1 Km LAYER PRECIPITABLE WATER PERCENT ERRORS
September 10, 2001 Run of December 15, 2000 Data
All Cases Successful (72.2%)
Truth Clear (12.6%)
Retrieval Called Clear (1.5%)
PRESSURE (mb)
200
400
600
800
1071
0
5
10
15
20
25
RMS ERROR
WATER RMS ERRORS
Total %
1 Km LAYER %
9.3 10.9
8.4 11.6
8.0 11.6
All Cases Successful
Truth Clear
Retrieval Called Clear

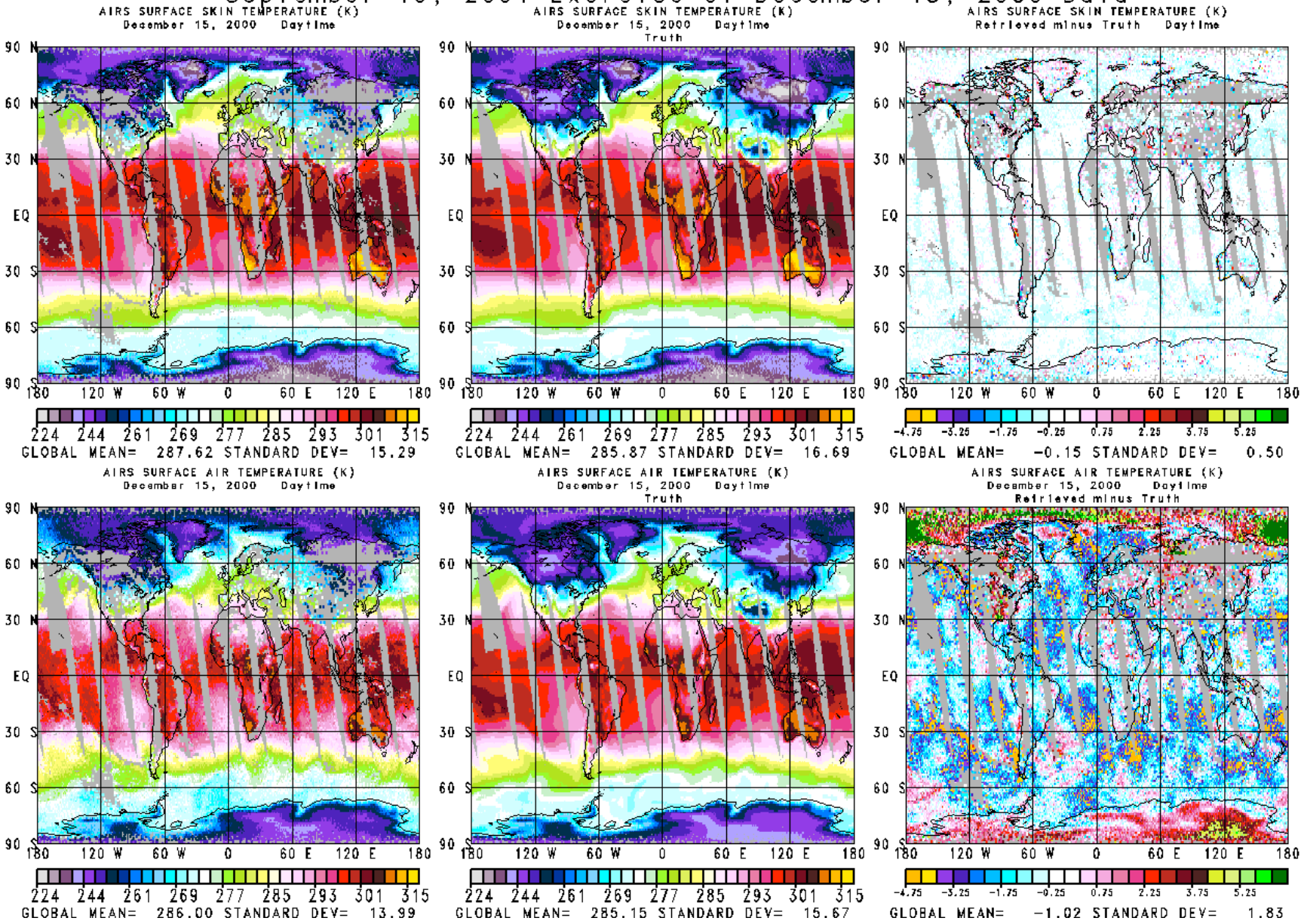
AIRS Cloud Parameters

September 10, 2001 Exercise of December 15, 2000 Data



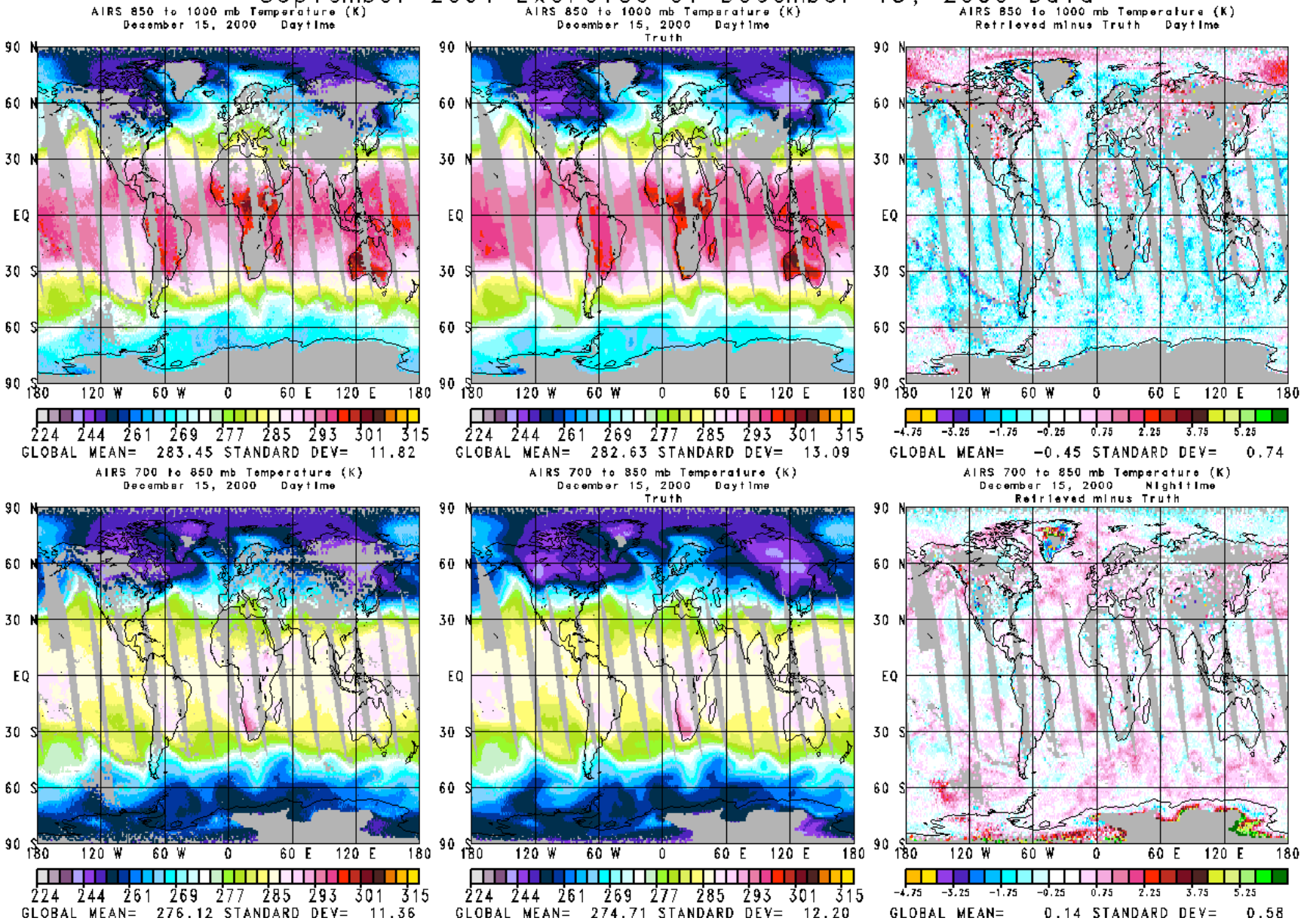
AIRS Surface Temperatures (K)

September 10, 2001 Exercise of December 15, 2000 Data

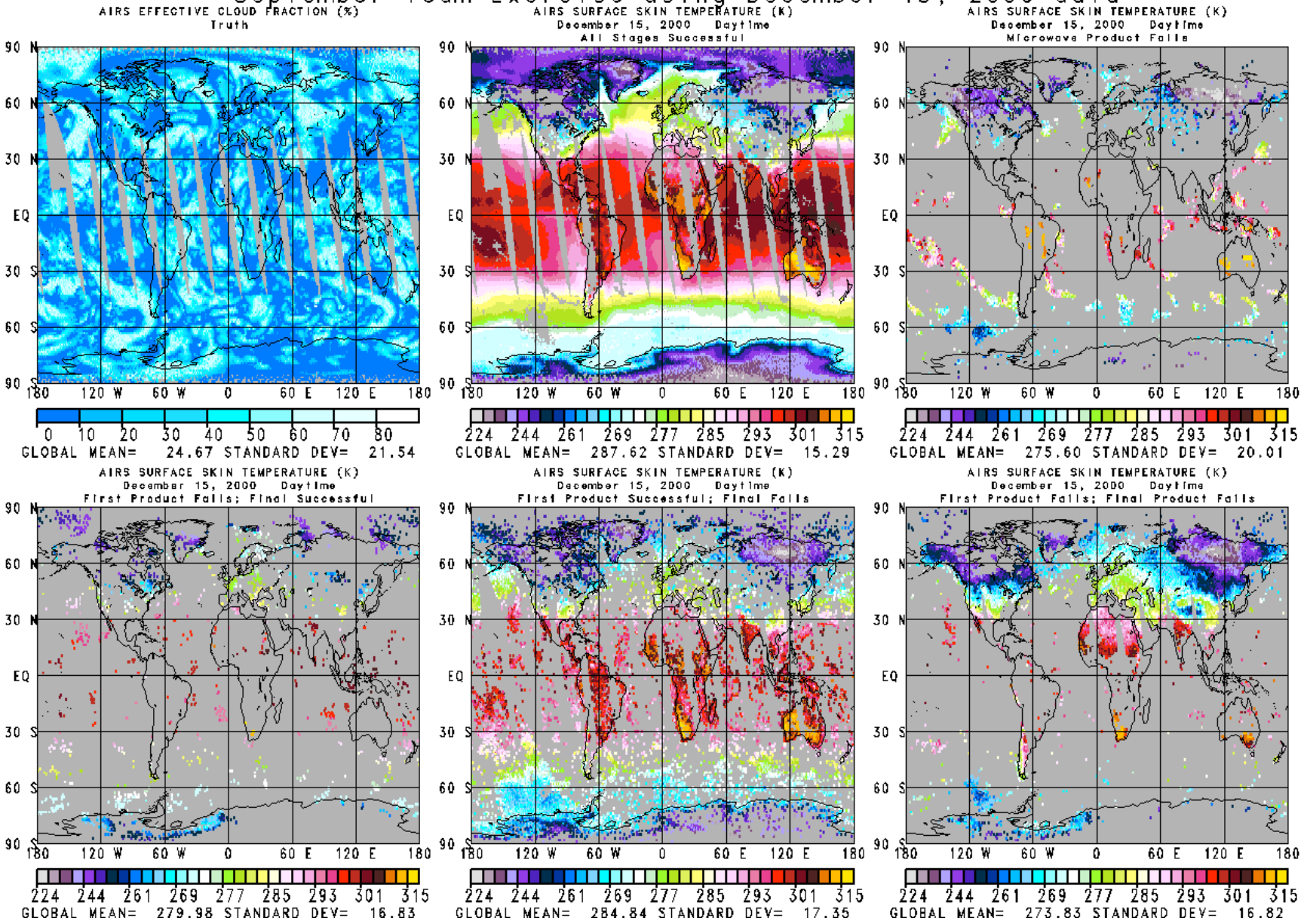


AIRS Temperature Layers(K)

September 2001 Exercise of December 15, 2000 Data



AIRS Clouds and Surface Skin Temperature
September Team Exercise using December 15, 2000 data



THINGS TO DO BEFORE LAUNCH PLUS THREE MONTHS

IDENTIFY AND CORRECT CAUSE OF FAILURE OF MICROWAVE PRODUCT IN LARGE CONTIGUOUS AREAS

- PRODUCE CLOUD AND OLR PRODUCTS IN CASES OF FAILURE OF MICROWAVE PRODUCT STEP
  - NEEDS PLUMBING FROM JPL

IDENTIFY AND CORRECT CAUSE OF FAILURE OF FIRST AND FINAL PRODUCT OVER LARGE LAND AREAS

REDUCE COLD BIAS IN SURFACE AIR TEMPERATURE OVER OCEAN

IMPLEMENT AND TEST METHODOLOGY TO REMOVE A SIMPLE BIAS AND UPDATE CHANNEL NOISE COVARIANCE MATRIX REFLECTING DIFFERENCES BETWEEN OBSERVED AND COMPUTED RADIANCES

TEST AND OPTIMIZE RETRIEVAL SYSTEM IN THE EVENT THAT REGRESSION CANNOT PRODUCE A GOOD EMISSIVITY GUESS

ALL OF THE ABOVE SHOULD BE TESTED USING A MORE REPRESENTATIVE CLOUD FIELD THAN WE ARE USING

OTHER THINGS TO DO

IMPROVE ROBUSTNESS OF THE SYSTEM

- ALLOW FOR MISSING SPOTS OR INTERMITTANT CHANNEL FAILURE

IMPLEMENT TRACE GAS RETRIEVAL CAPABILITY (CH4, CO, CO2) AT JPL

IMPROVE CAPABILITIES IN ERROR ESTIMATES OF PRODUCTS