The AWG Cloud Team Members

AWG Cloud Team Chair : Andrew Heidinger

- Cloud Mask
  - **Andrew Heidinger (Lead)**
  - Alexander Ignatov
  - Tony Schreiner
- Cloud Type Phase
  - **Michael Pavolonis (Lead)**
- Cloud Height & Cloud Cover Layers
  - **Andrew Heidinger (Lead)**
  - Michael Pavolonis
  - Jim Jung
  - Tony Schreiner
- Daytime Optical/Microphysical Properties
  - **Andi Walther (Lead)**
  - Andy Heidinger
  - Bryan Baum
  - Steve Platnick
  - Ping Yang
- Nighttime Optical/Microphysical Properties
  - **Pat Minnis (Lead)**
  - Pat Heck

Software Development

- **Peter Keehn (Lead)**
- Andrew Heidinger
- William Straka

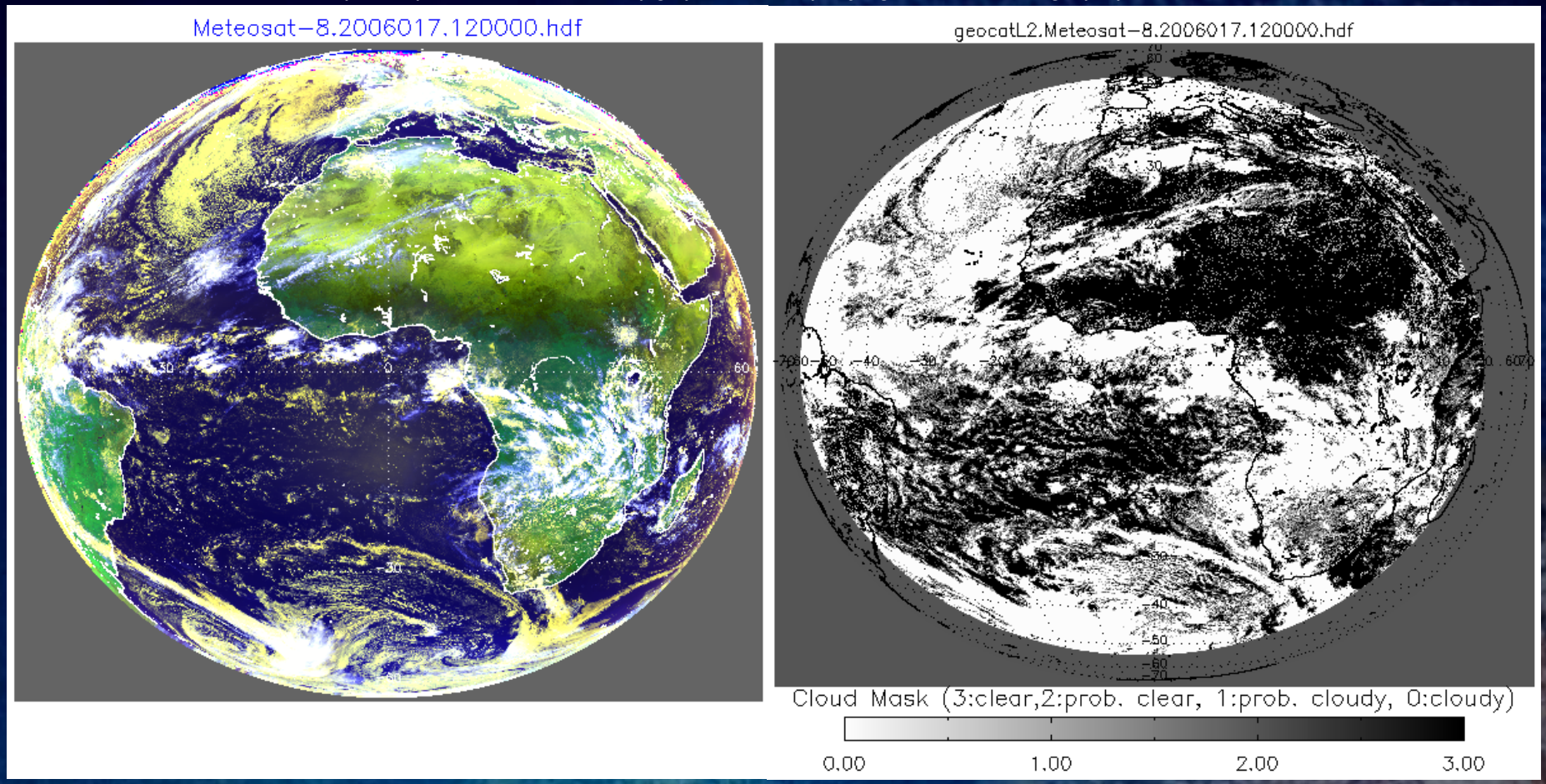
GOES-R Cloud Products

Chair: Andy Heidinger NOAA NESDIS

- Clear Sky Mask
- Cloud Top Phase
- Cloud Type
- Cloud Top Height
- Cloud Top Temperature
- Cloud Top Pressure
- Cloud Layers/Height & Thickness
- Cloud Optical Depth
- Cloud Particle Size Distribution
- Cloud Liquid Water
- Cloud Ice Water Path

Algorithm Output: Example 4-level Mask

Example Output of the Cloud Mask (right) with accompanying False Color Image (left)



Performance Estimates

•With the launch of CALIPSO (a lidar) and CLOUDSAT (a radar) into the EOS A-train, we now unprecedented information on the vertical structure of clouds.

• CALIPSO is very sensitive to the presence of any cloud in the column and therefore is our first choice in cloud height validation.

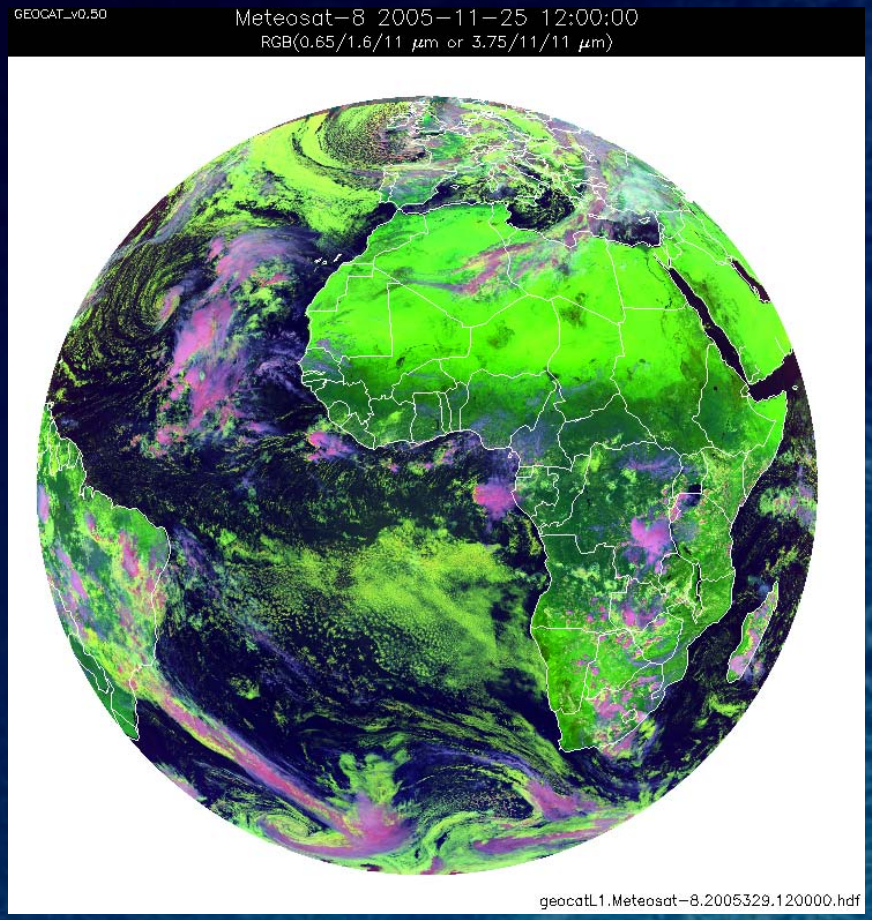
•The weaknesses of CALIPSO are low snr during the day and difficulty distinguishing cloud from aerosol.

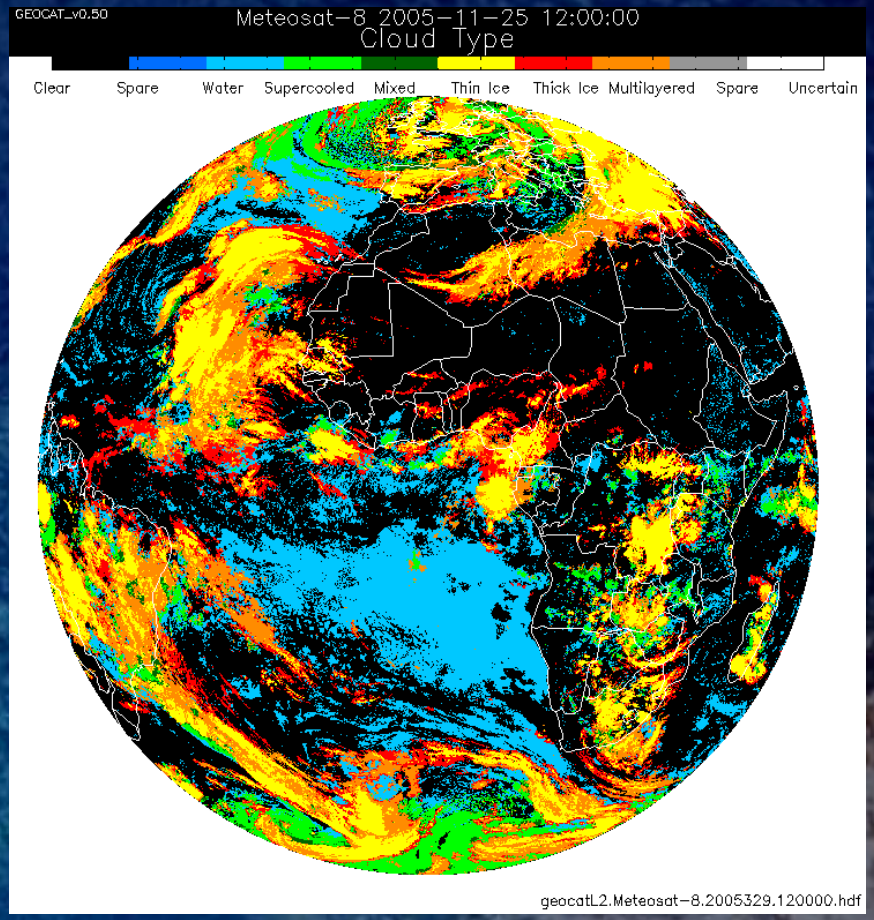
•Even with these weaknesses, CALIPSO is the best we have.

•Similar data should exist in the GOES-R era (Earth-Care…)

Retrieval Strategy

Full disk cloud type results

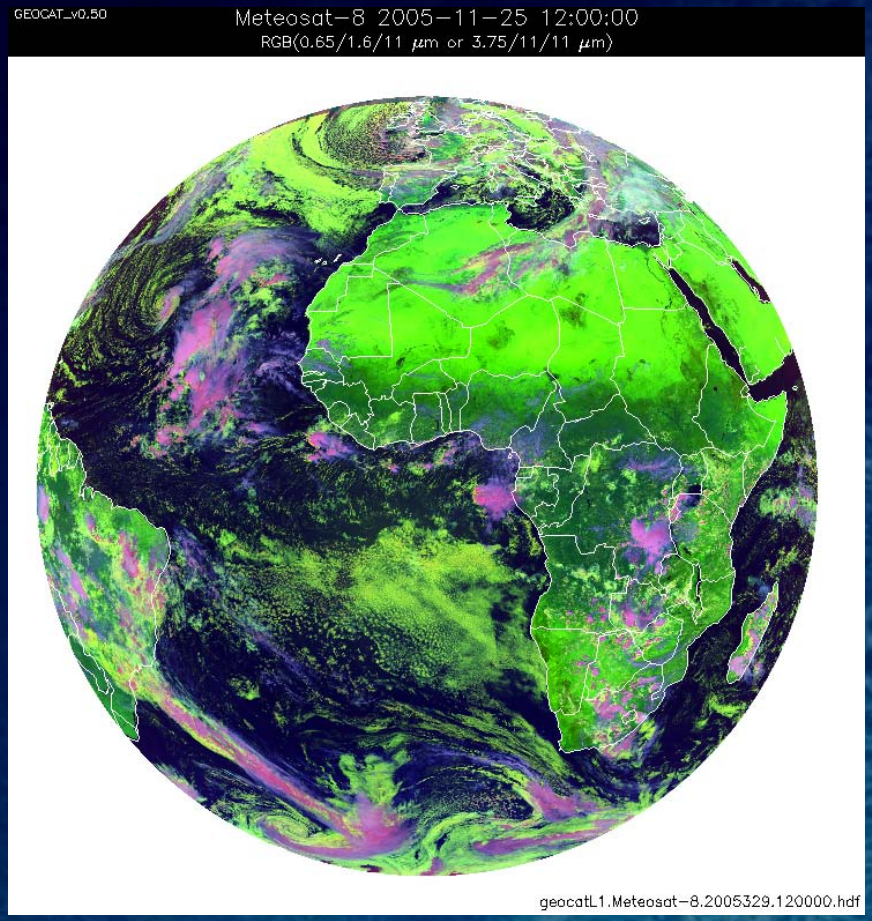


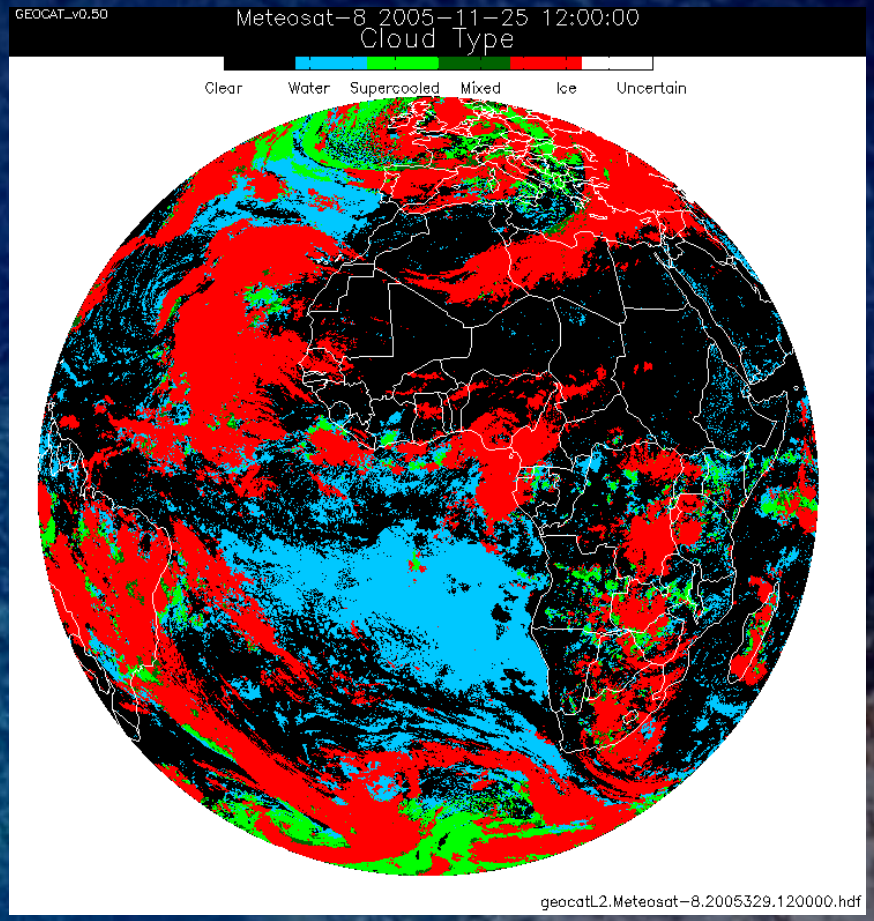


Water, Supercooled Water, Mixed Phase, Thick Ice, Thin Ice, Multilayered

Retrieval Strategy

Full disk cloud phase results





Water, Supercooled Water, Mixed Phase, Ice

Error Budget (preliminary)

All detected clouds with an IR emissivity > 0.4 (~visible optical depth of 1.0)

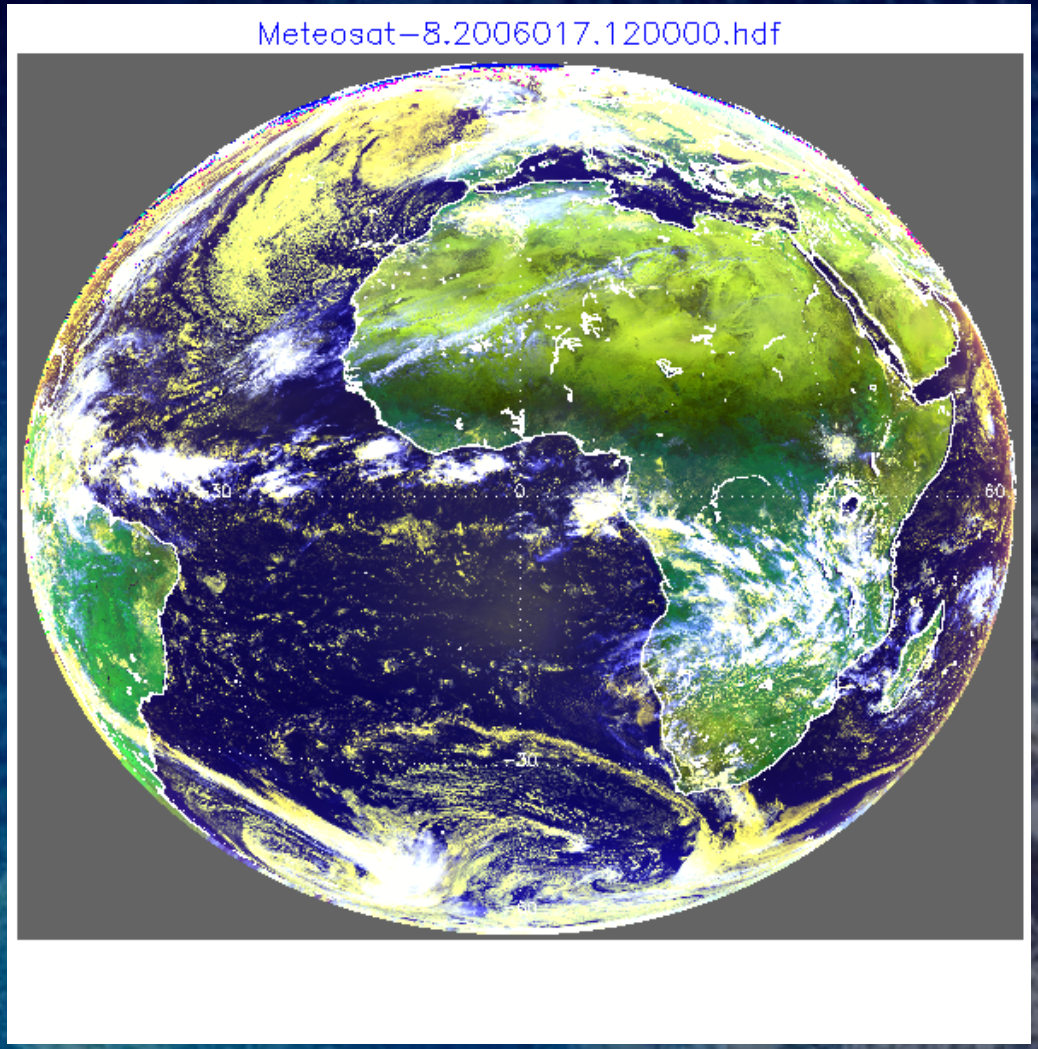
Category	CALIPSO Count	ABI Phase Count	Percent Agree	Percent Disagree
Liquid Water	3544	3485	98.33%	1.67%
Single Layer Ice	882	875	99.21%	0.79%
Multi-layered Ice	679	651	95.88%	4.12%
Total	5105	5011	98.16%	1.84%

Algorithm Output

The following images show sample output of he ABI cloud height algorithm run on a SEVIRI scene (January 17, 2006 12 UTC).

The image on the right shows a false color image constructed from channels 2,3 and 14.

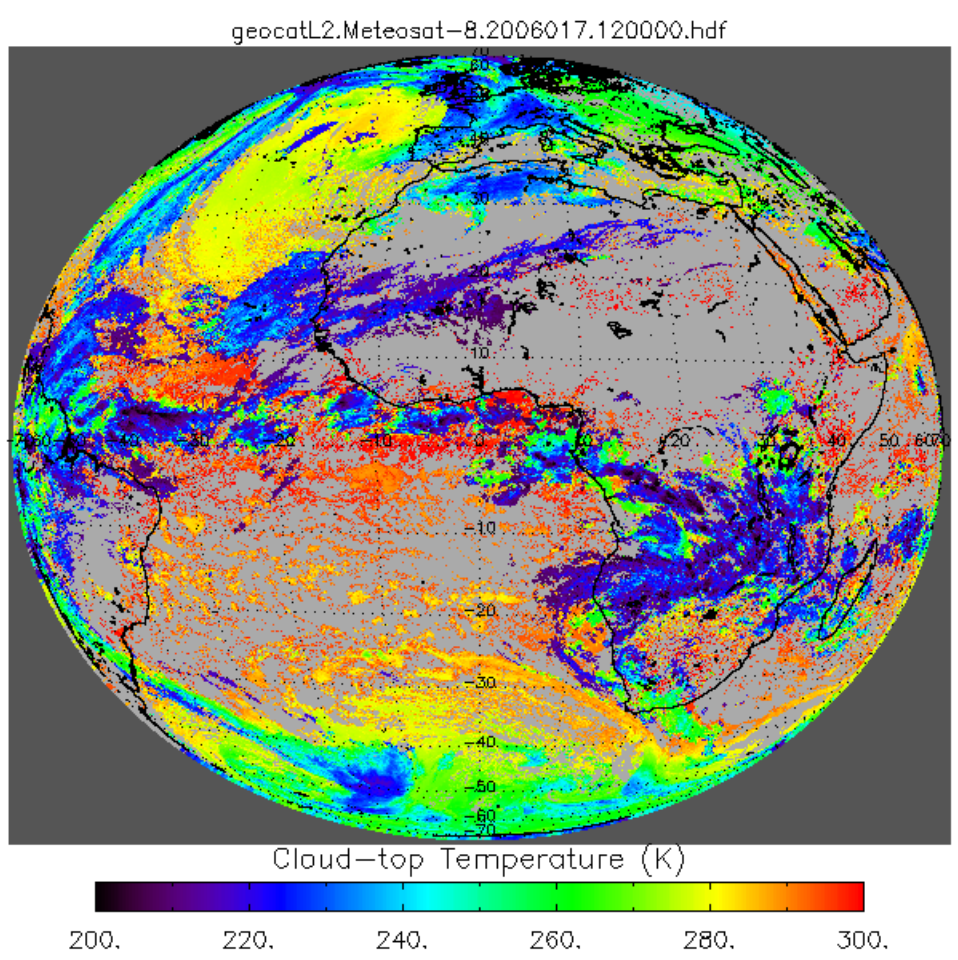
High thick clouds are white while low clouds are yellow.



Algorithm Output

Image of the cloud-top temperature.

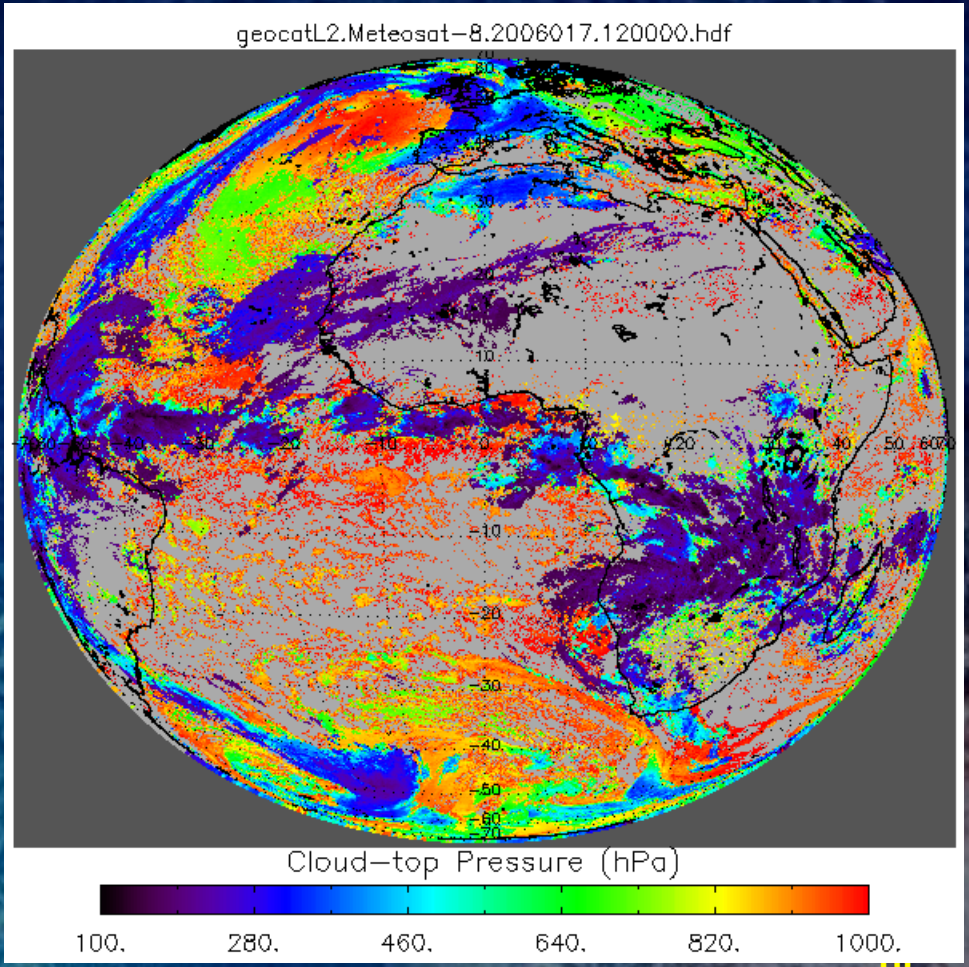
Grey regions represent pixels where no retrieval was performed (i.e. clear-sky)



Algorithm Output

Image of the cloud-top pressure.

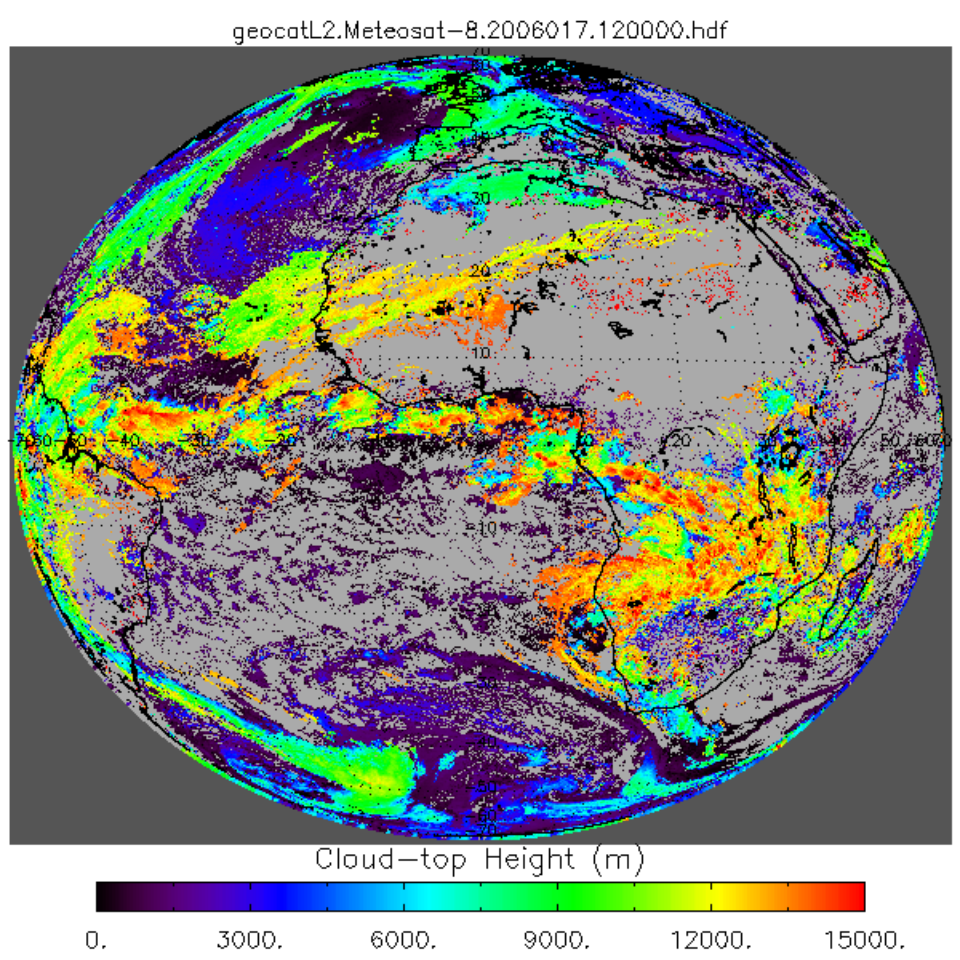
Light grey regions represent pixels where no retrieval was performed (i.e. clear-sky)



Algorithm Output

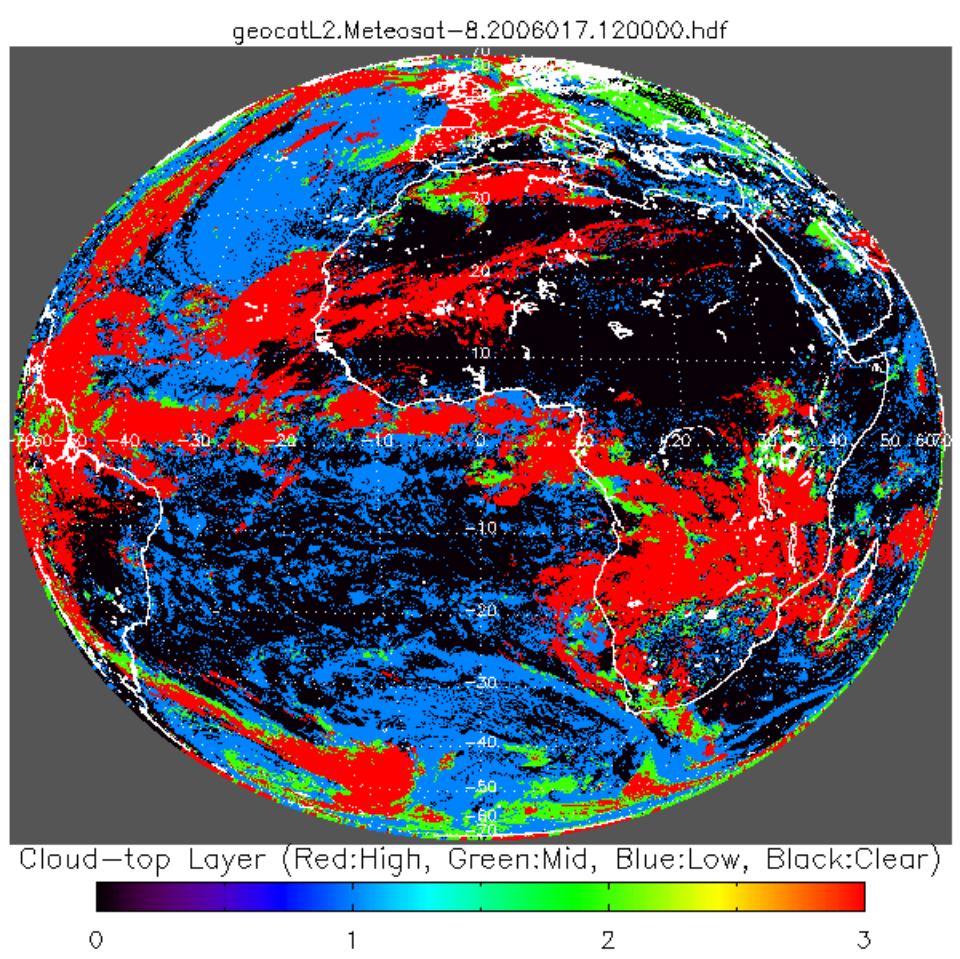
Image of the cloud-top height.

Light grey regions represent pixels where no retrieval was performed (i.e. clear-sky)



Algorithm Output

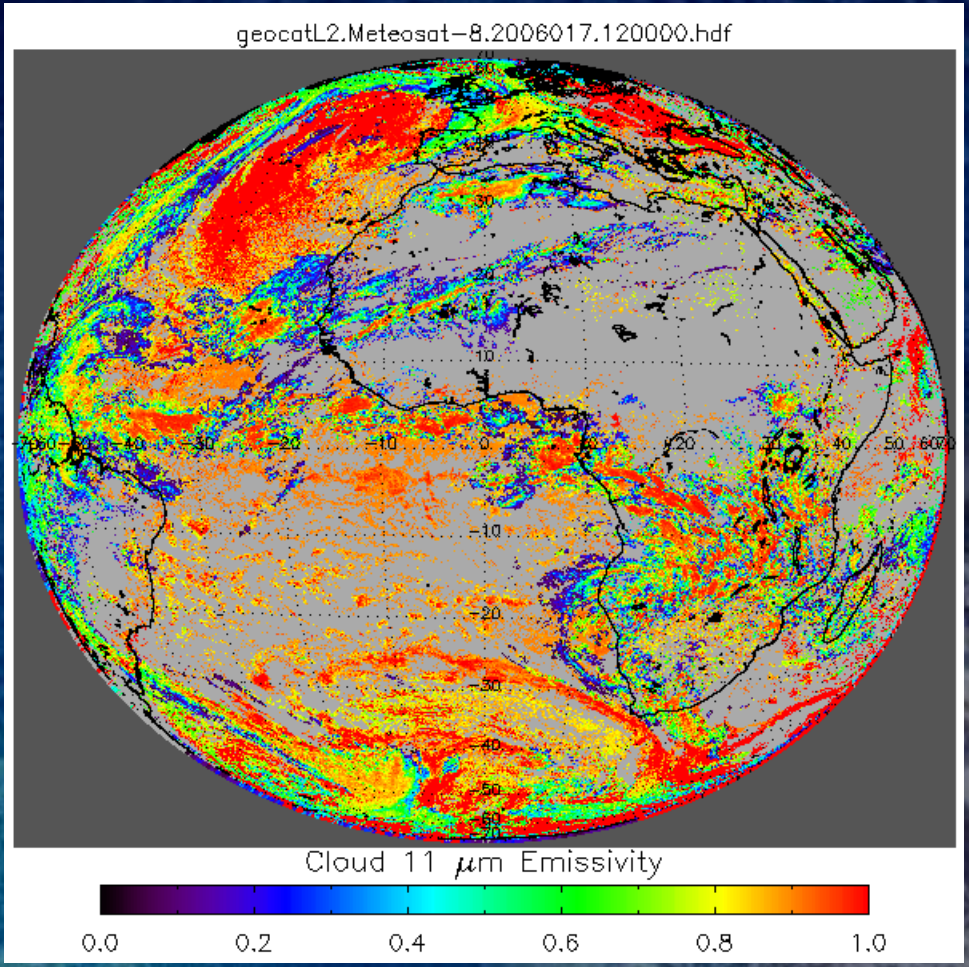
Image of the cloud layer flag.



Algorithm Output

Image of the cloud emissivity in channel 14 (11 microns).

Grey regions represent pixels where no retrieval was performed (i.e. clear-sky)



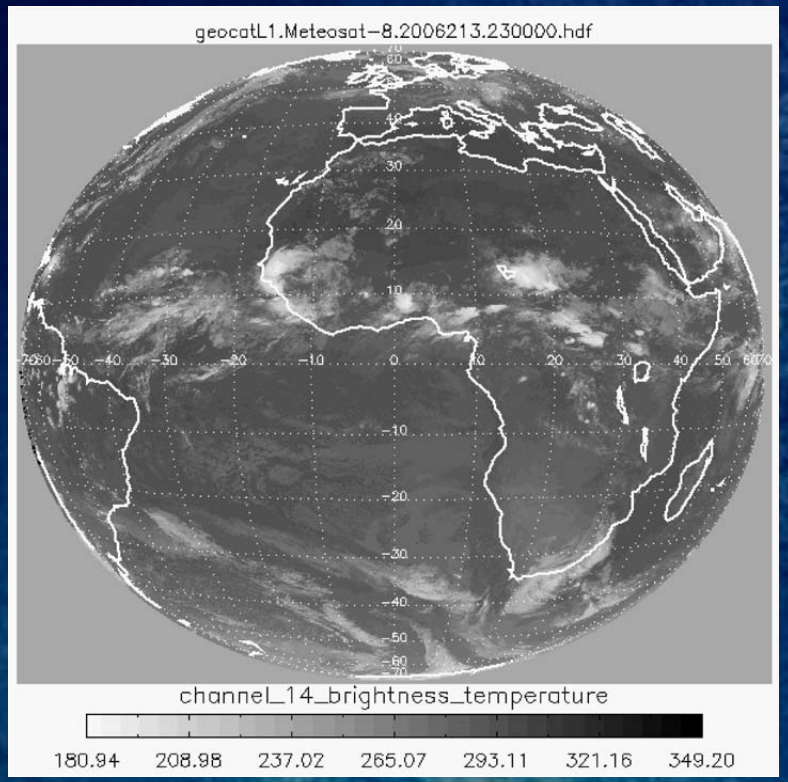
NCOMP Algorithm Test Using SEVIRI Data

Examples of Algorithm Input

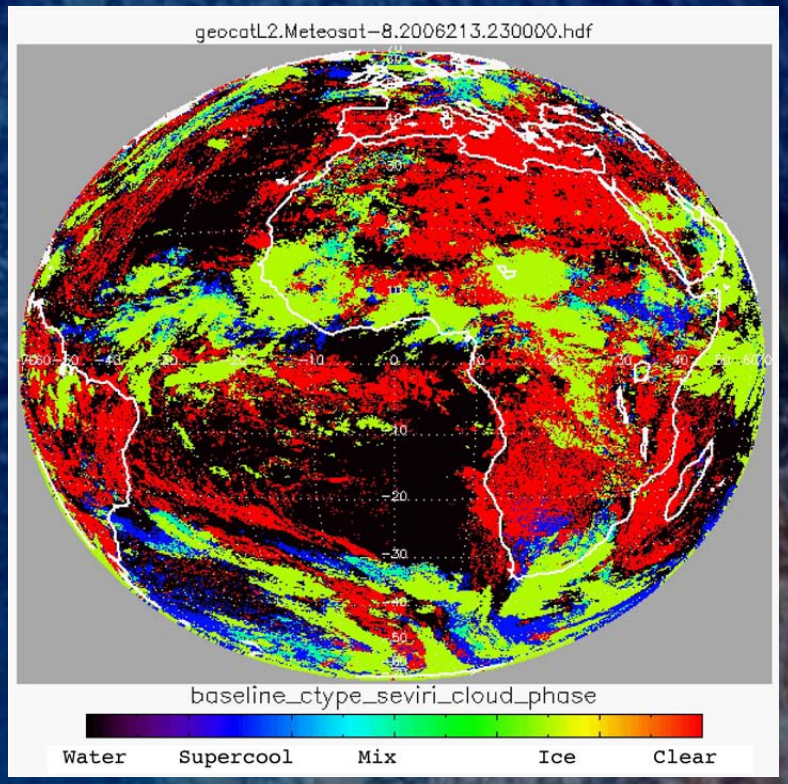
- » **Sensor Input**: SEVIRI channel 14 (7 and 15 also used)
- » **Ancillary Input**: ABI Cloud type (phase)

August 1, 2008
23:00 UTC

SEVIRI Channel 14



ABI Phase



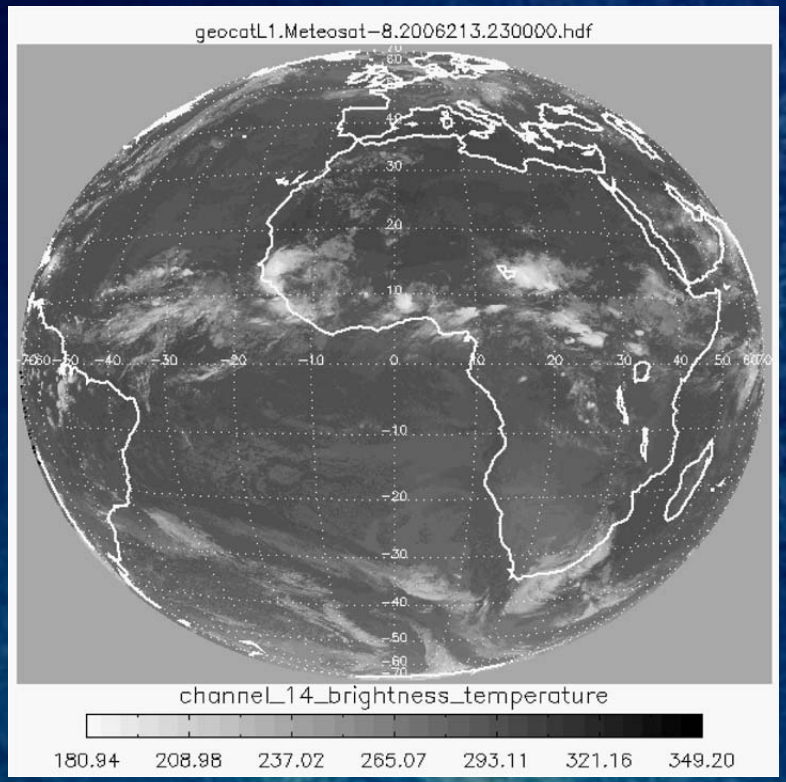
NCOMP Algorithm Test Using SEVIRI Data (2)

Examples of Algorithm Input:

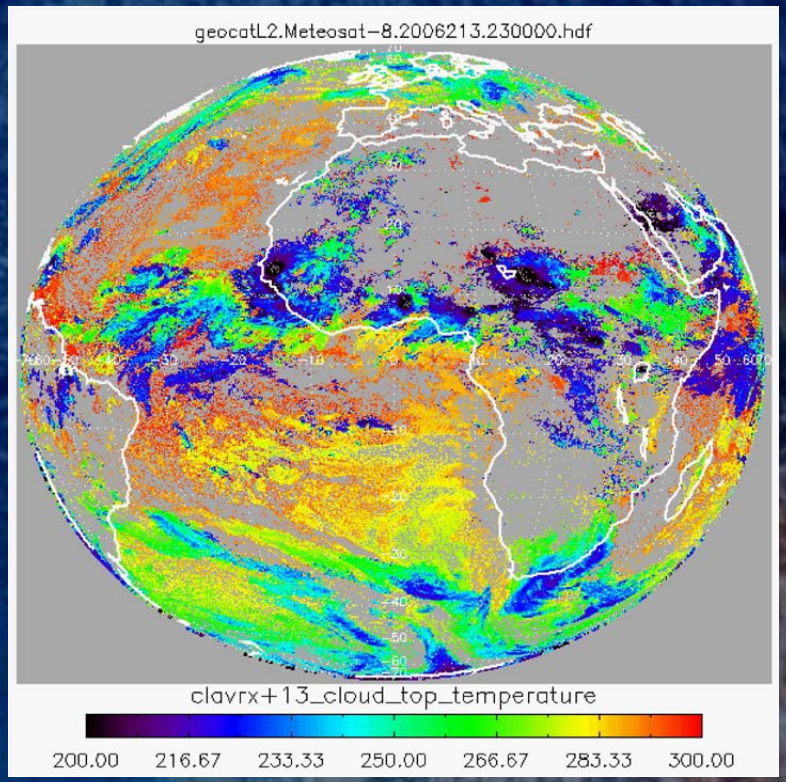
- » **Sensor Input**: SEVIRI Channel 14 (7 and 15 also used)
- » **Ancillary Input**: ABI T_{cld}

August 1, 2008
23:00 UTC

SEVIRI Channel 14



ABI T_{cld}



NCOMP Algorithm Test Using SEVIRI Data (3)

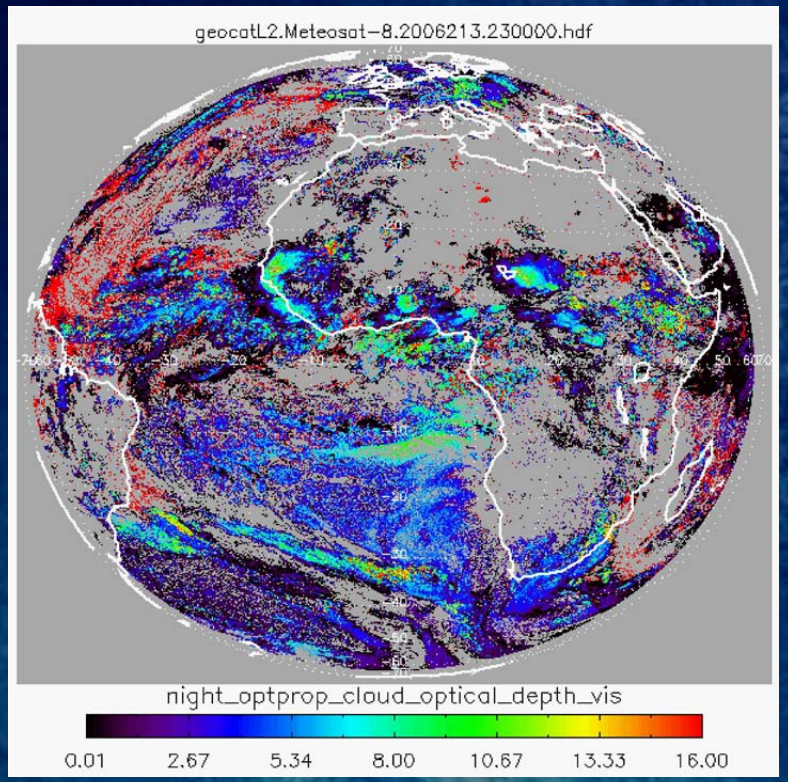
Examples of Algorithm Outputs:

» Cloud optical depth

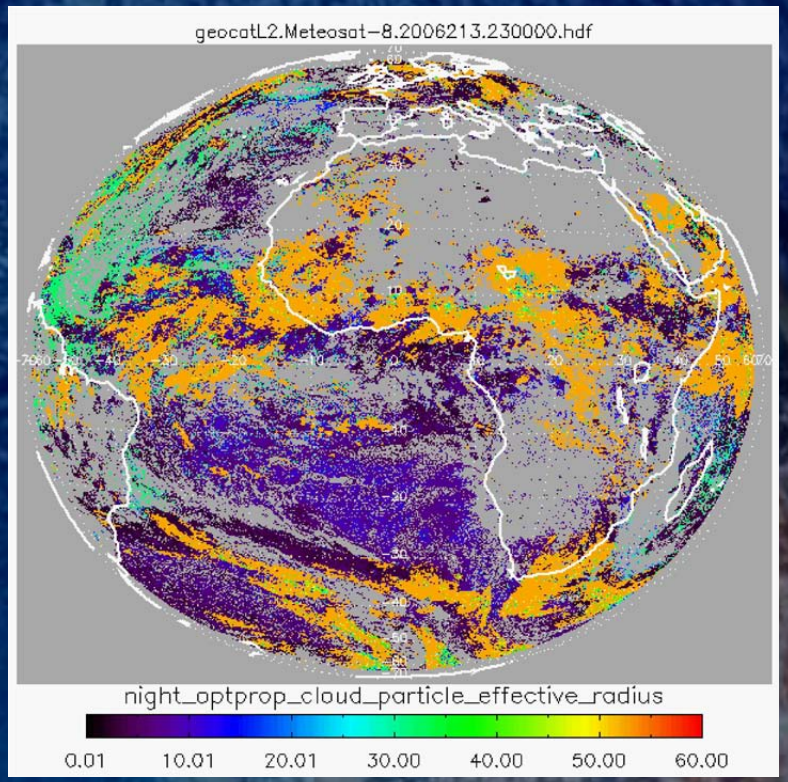
» Cloud effective particle size

August 1, 2008
23:00 UTC

ABI Optical Depth



ABI Effective Particle Size (*μm*)



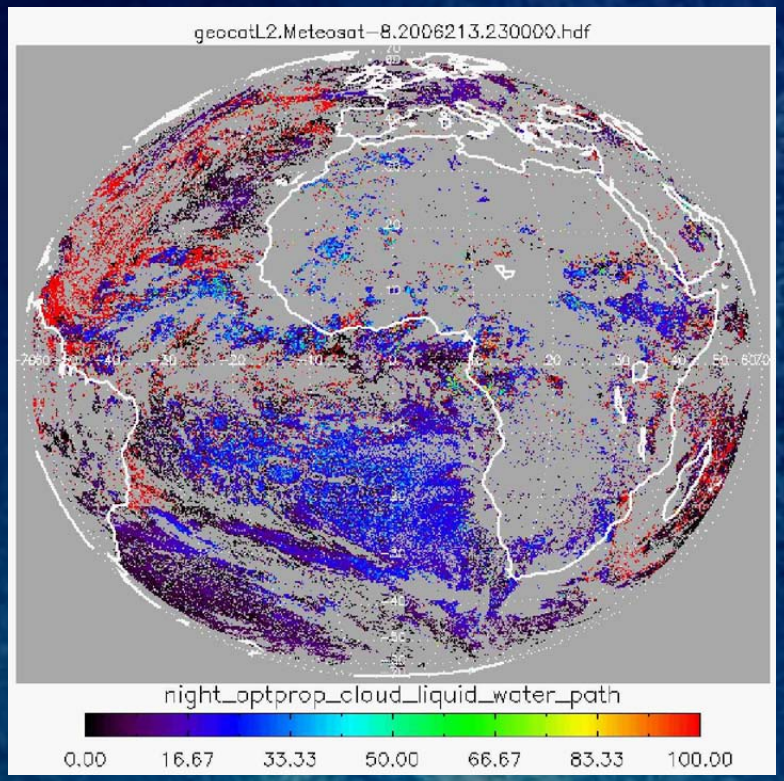
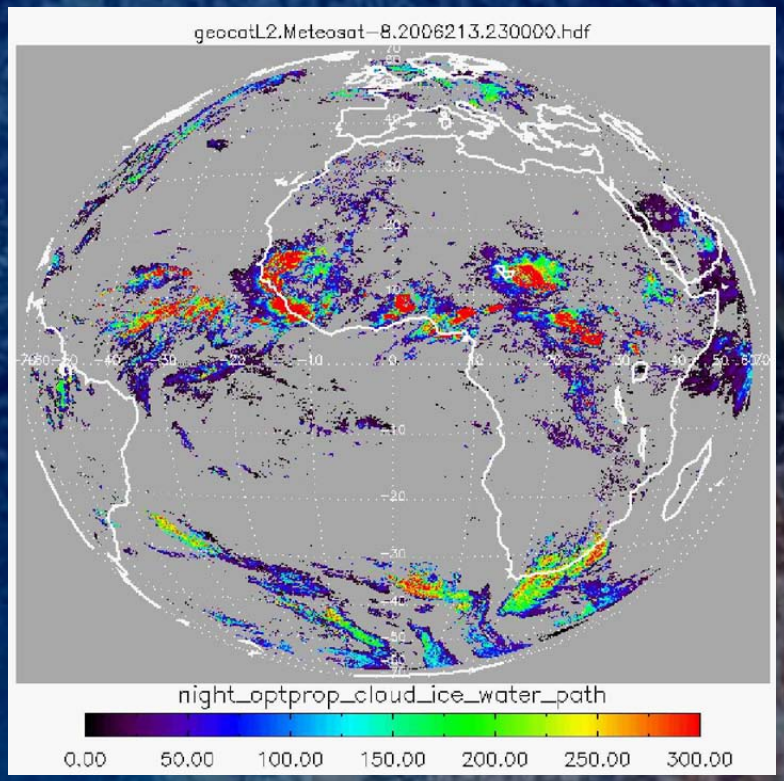
NCOMP Algorithm Test Using SEVIRI Data (4)

Examples of Algorithm Outputs:

- » Cloud liquid water path
- » Cloud ice water path

August 1, 2008
23:00 UTC

ABI LWP (*g/m²*)



ABI IWP (*g/m²*)