Visualizing VIIRS via NexSat

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[4]Science Applications International Corp (SAIC), Monterey, CA

AMS 2012 - 8th Annual Symposium for Future Operational Environmental Satellite Systems

Outline

1. NexSat Overview:
   Next-Generation Weather **Sat**ellite Demonstration Project

2. VIIRS webpage

3. VIIRS First Light Examples
   a. Comparing VIIRS to heritage sensors

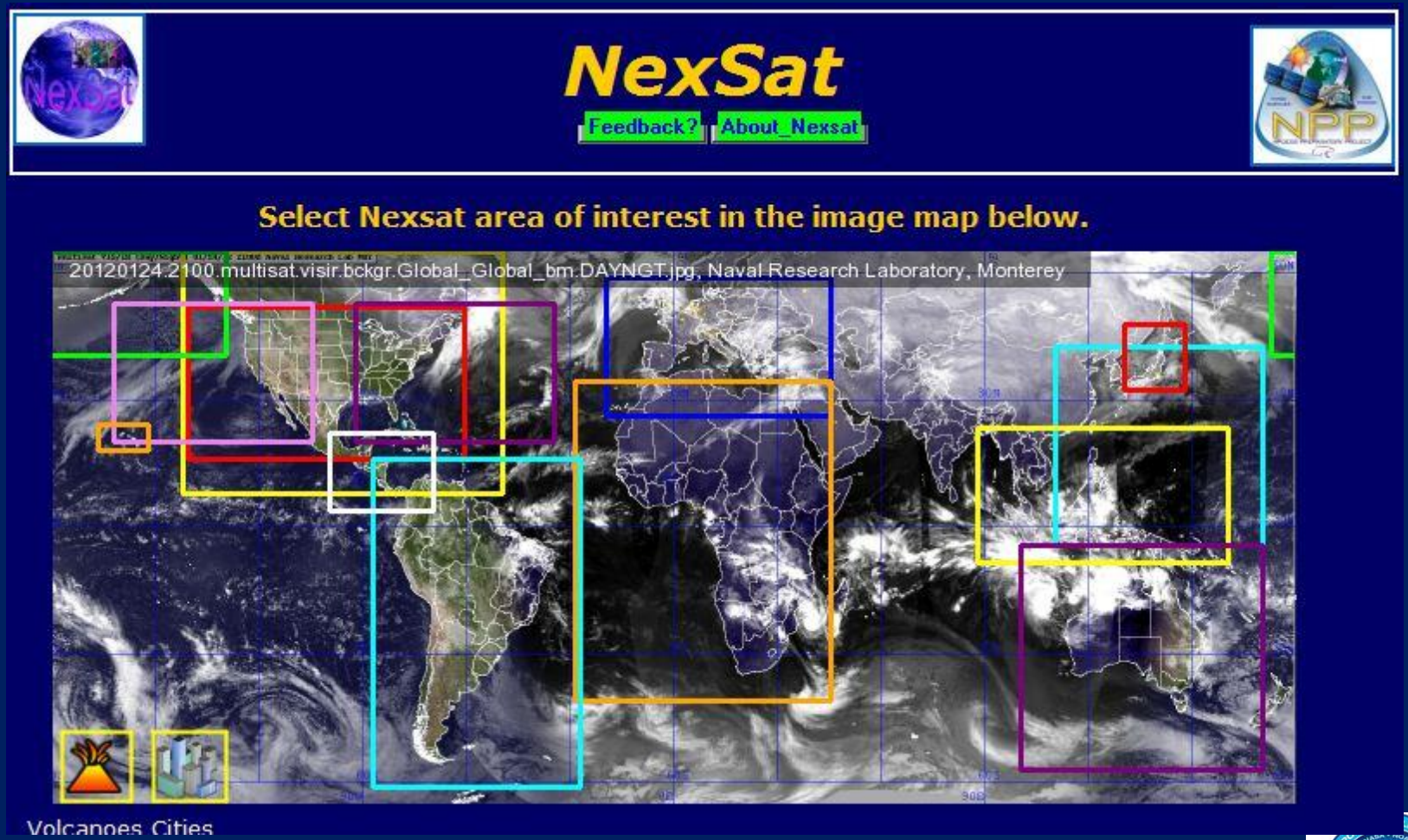
4. Ocean Color Products

NexSat Evolution

- Started in 2003
  - Demonstrate VIIRS using heritage sensors over CONUS
    - MODIS, OLS, AVHRR, and SeaWiFS
    - "Near real time" – key aspect for user understanding
  - Evolved into operational and field research resource
- 2003 - 2011
  - Potentially use 30+ LEO and GEO sensors available to NRL-MRY
  - Collaborative partners (FNMOC, AFWA, NOAA, NASA, CIRA, NAVO)
  - Leveraging efforts from NRL & multi academic/government agencies
  - Field support, environmental disaster monitoring, satellite training
  - GOES-R Proving Ground resource
- Pre- and post-launch activities
  - Provided VIIRS proxy products from NRL Stennis (ocean color)
  - VIIRS ingest and "1st Light" product generation
  - VIIRS imagery and derived product display-distribution

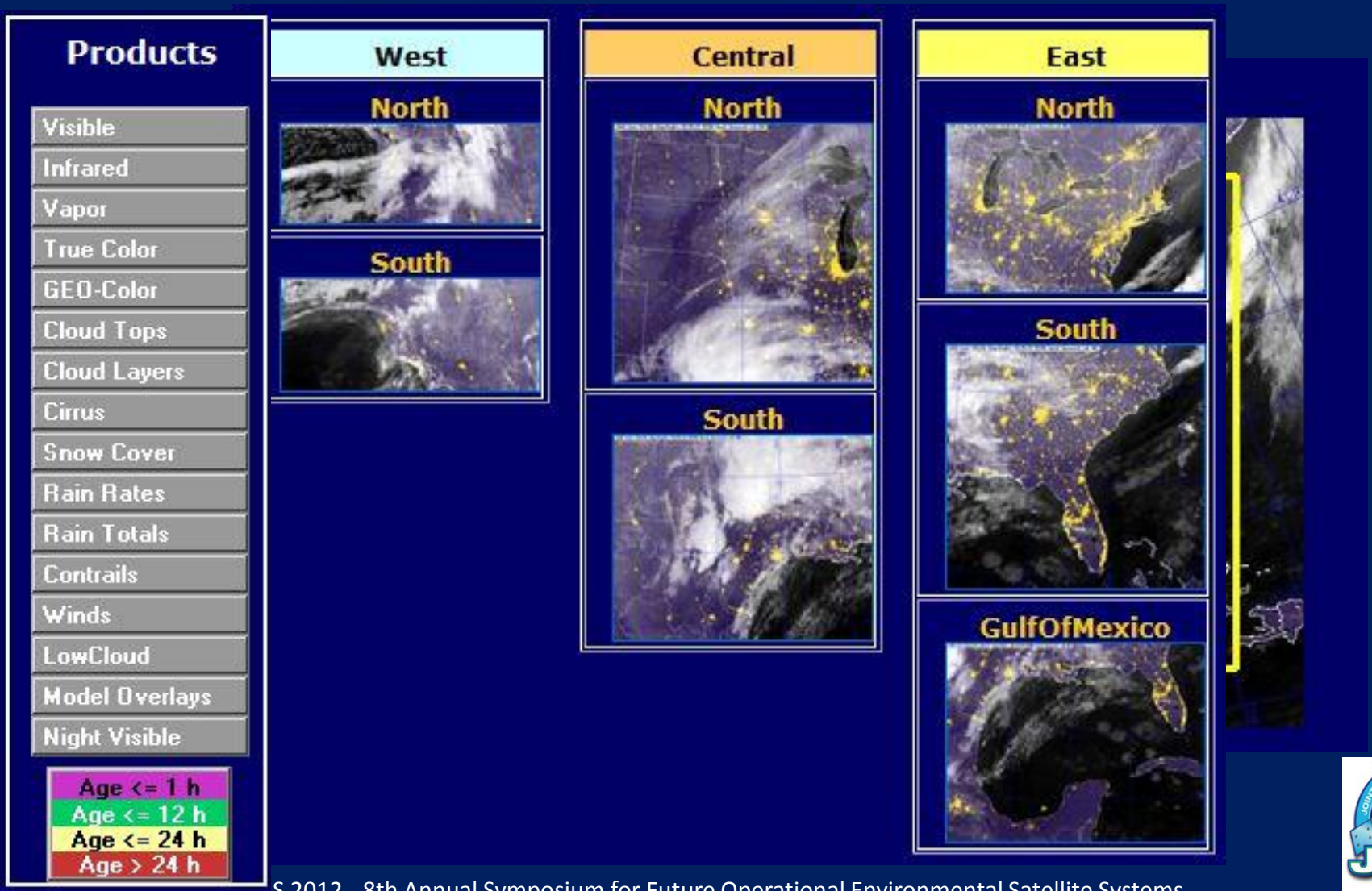
NexSat:

http:www.nrlmry.navy.mil/NEXSAT.html



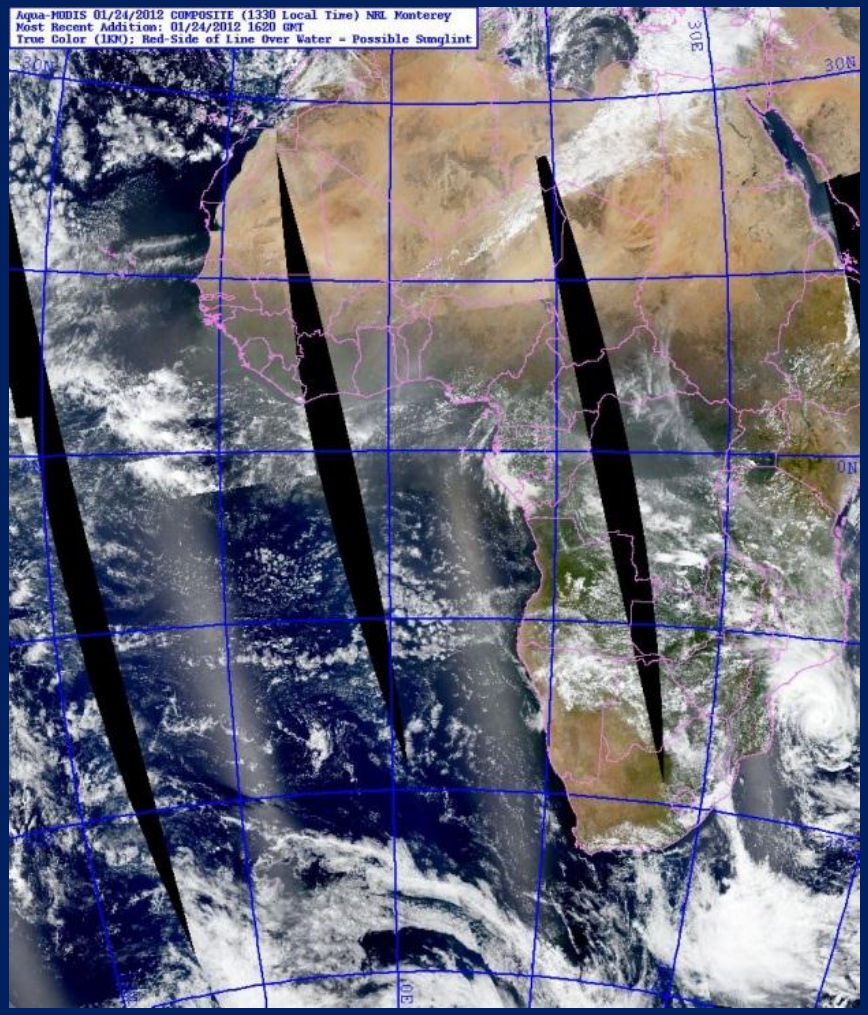
NexSat: CONUS Domain

http:www.nrlmry.navy.mil/NEXSAT.html



NexSat: Africa Domain

MODIS True Color Mosaic

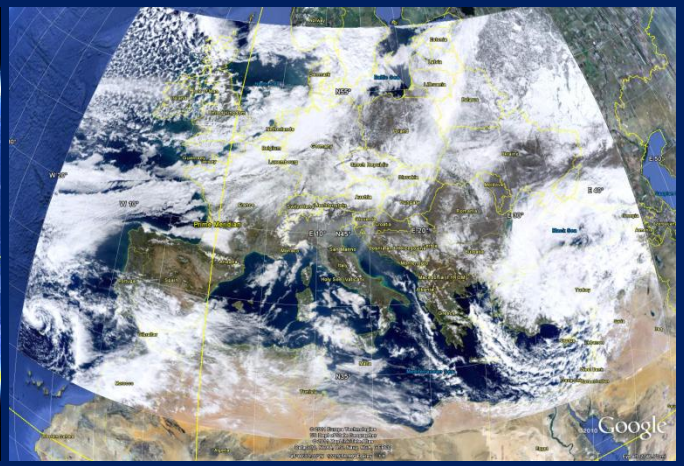


Tropical Cyclone 08S Funso

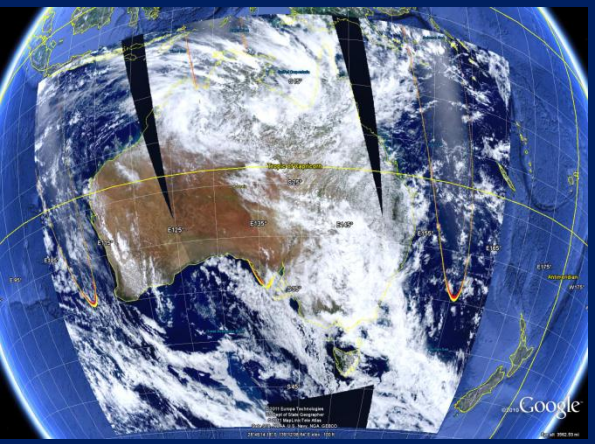
NexSat via Google Earth

1. **Covers major domains**
   - Also cities & volcanoes
2. **More products**
   - GEO-color
   - true color
   - dust
   - low clouds
3. **Animation capabilities**
   - GEO-color

CONUS

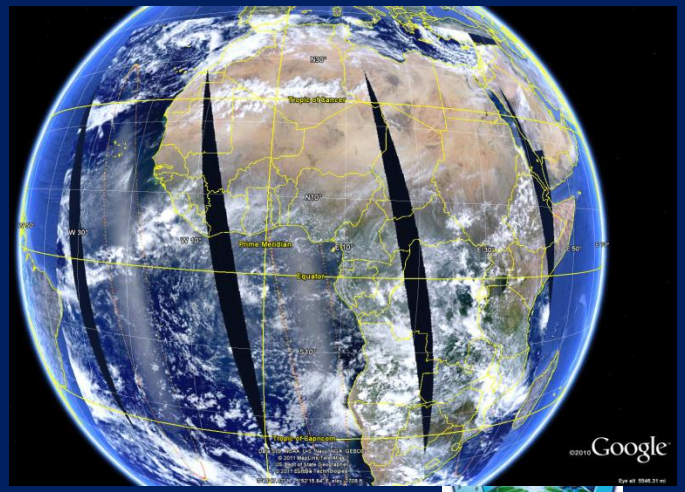


EUROPE



Australia

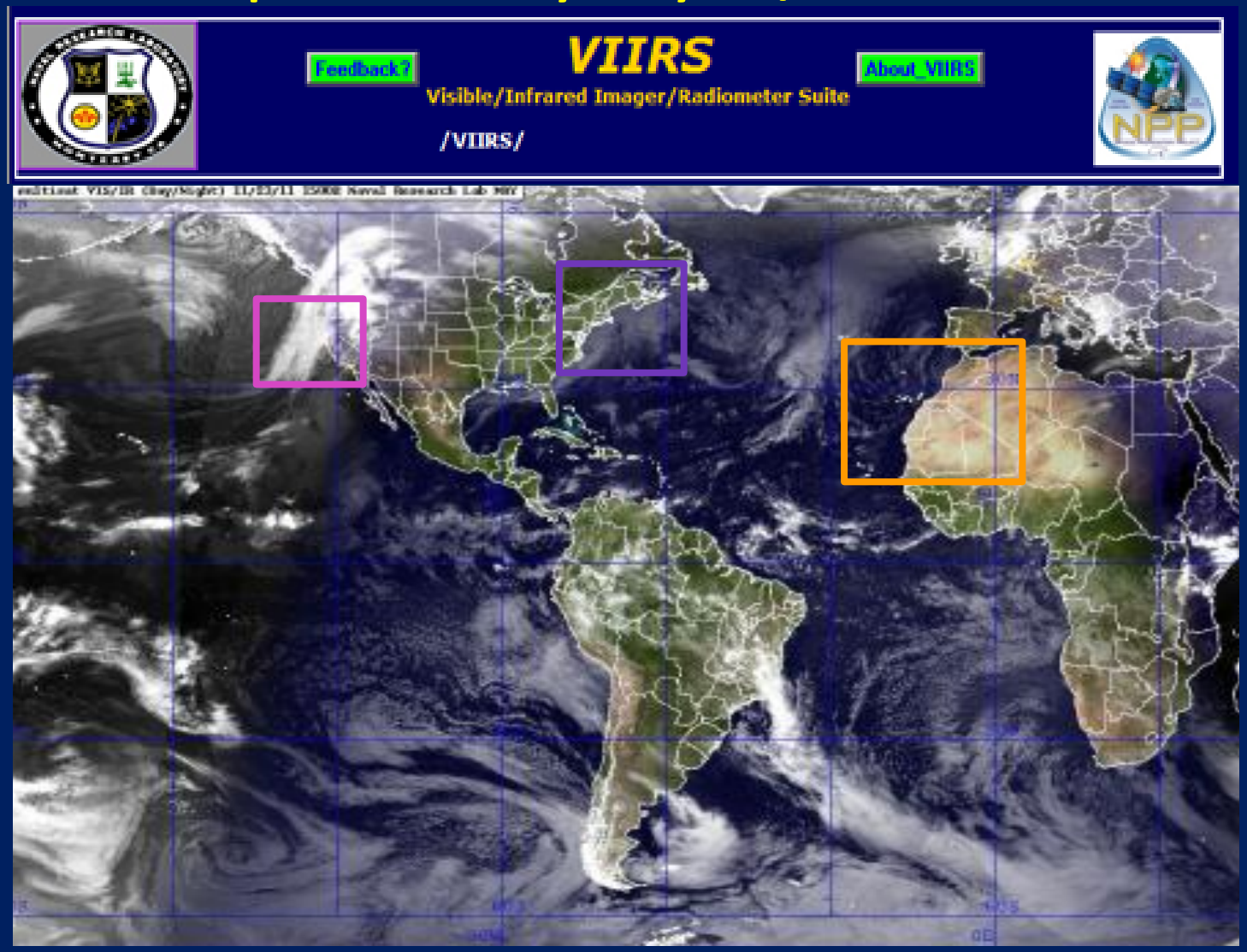
South America



Africa

NexSat: VIIRS Page

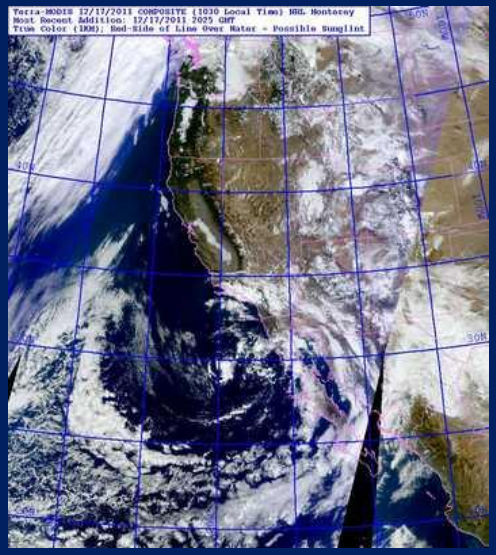
http:www.nrlmry.navy.mil/VIIRS.html



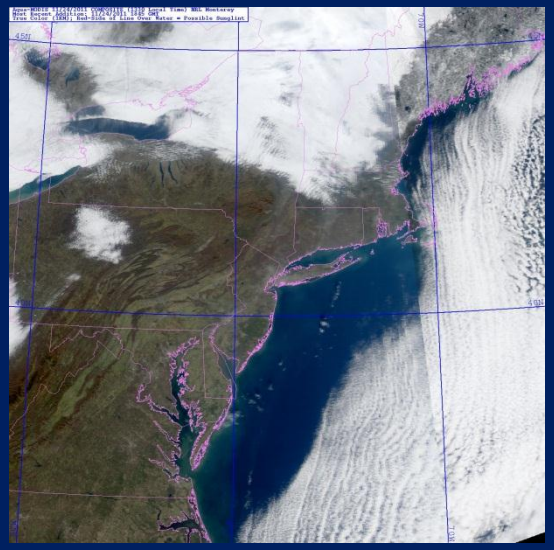
VIIRS "1st Light" Products

- **Initial product suite:**
  - Visible & Near IR channels
  - True Color and Day Night Band (DNB)
  - IR channels and derived products to follow shortly (doors opened 1-18-2012)

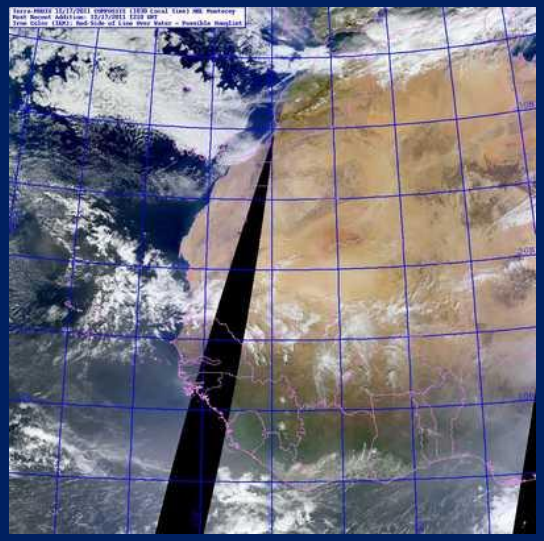
CONUS-West



CONUS-East

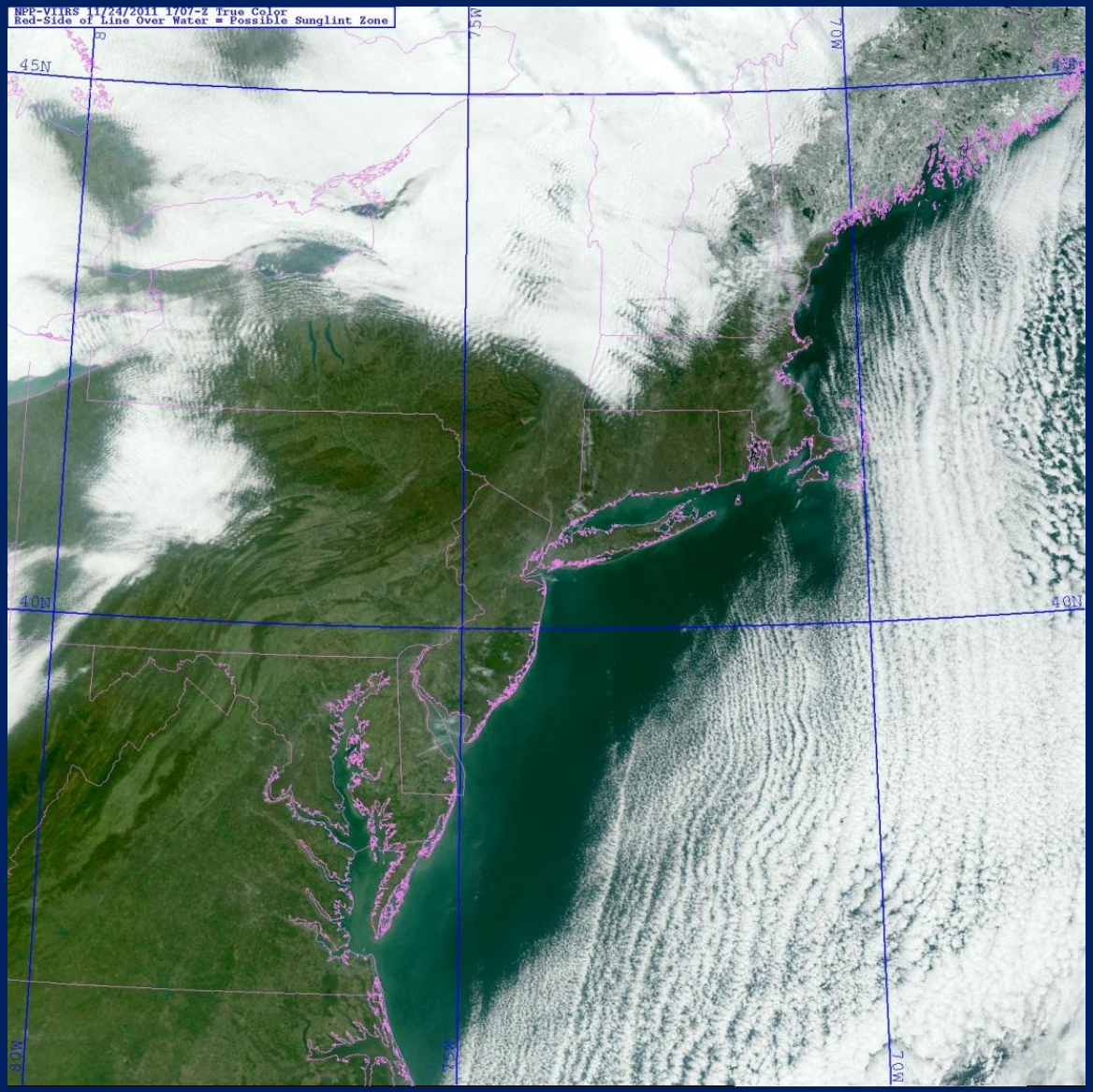


Northwest Africa



Multi-spectral Comparisons

True color - Northeast US

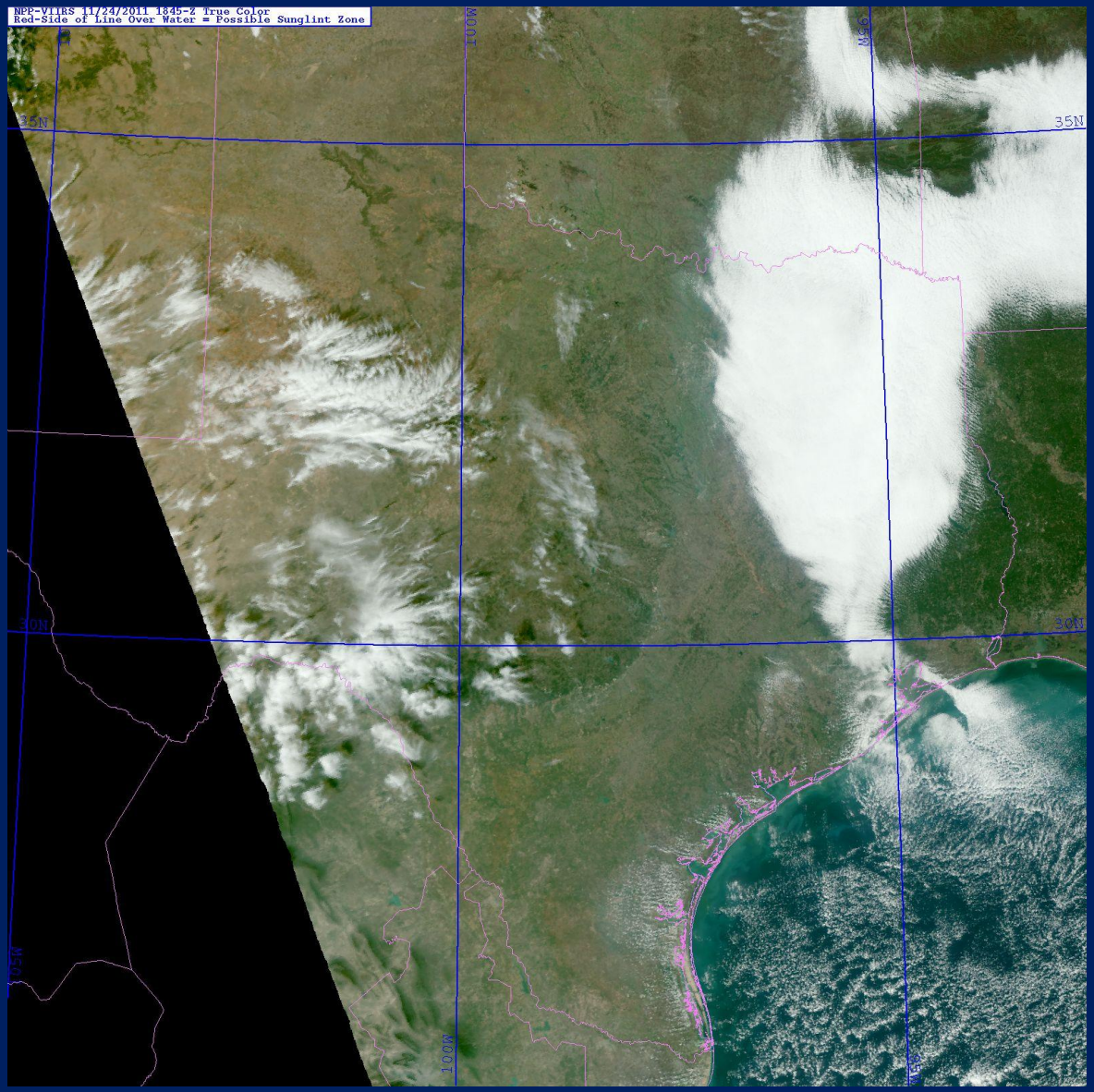


Multi-spectral Comparisons

True color – Texas

MODIS
1840z

VIIRS
1845Z

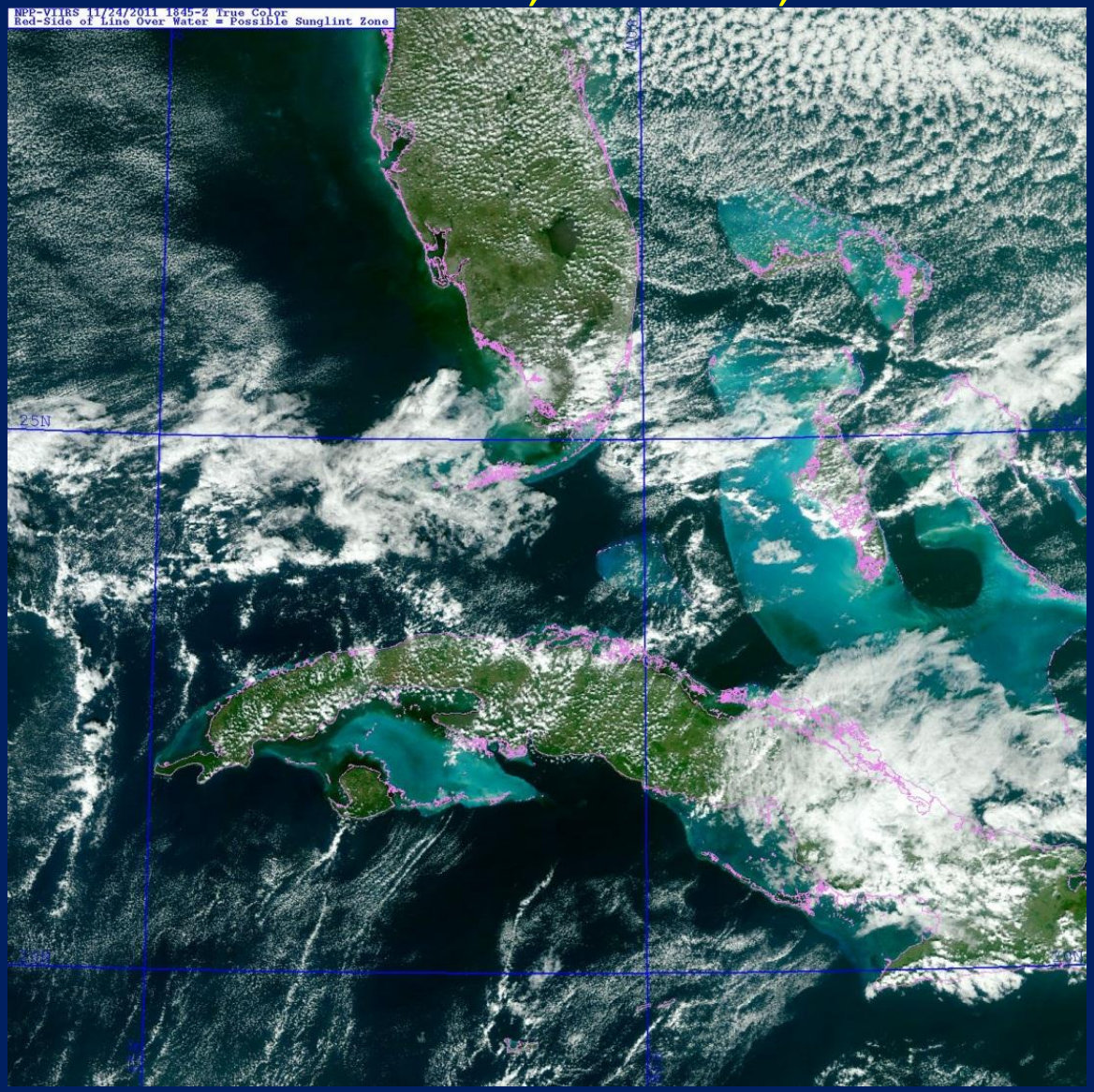


Multi-spectral Comparisons

True color – Florida, Bahamas, and Cuba

MODIS
1840z

VIIRS
1845Z

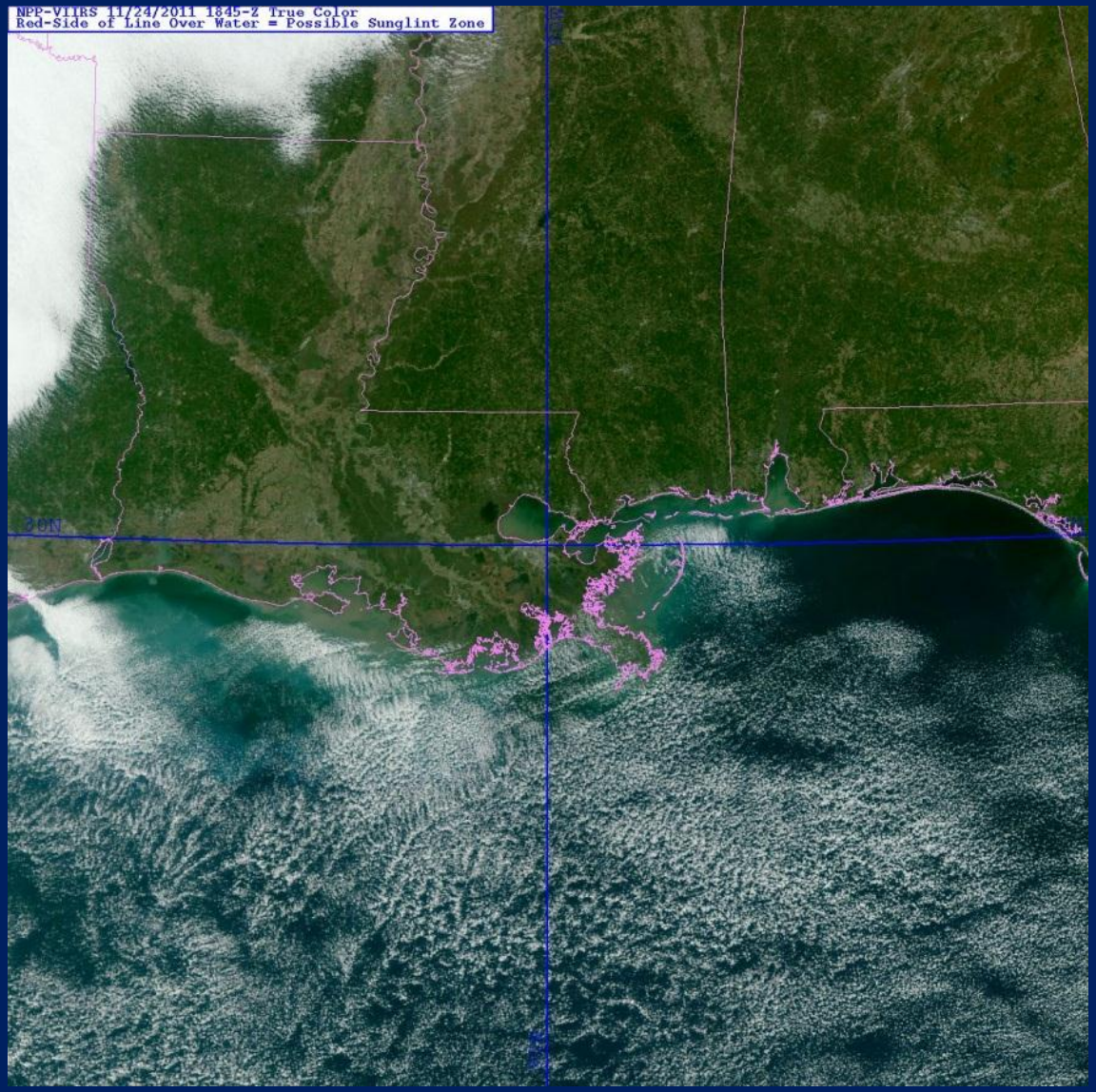


Multi-spectral Comparisons

True color – New Orleans

MODIS
1840z

VIIRS
1845Z



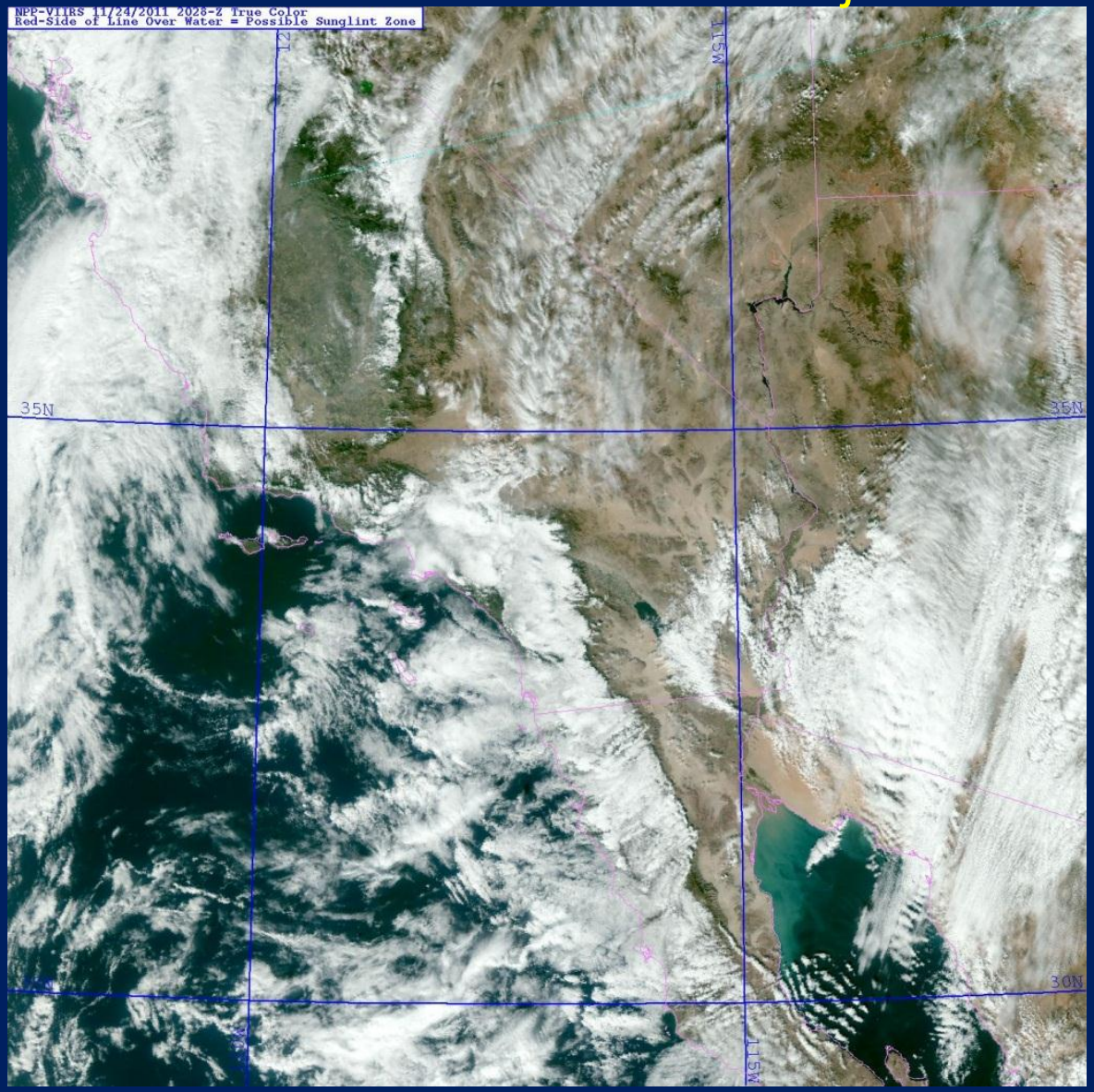
Resolution consistency across swath bodes well for AMV fidelity

Multi-spectral Comparisons

True color – SW USA & Baja

MODIS
2020Z

VIIRS
2028Z

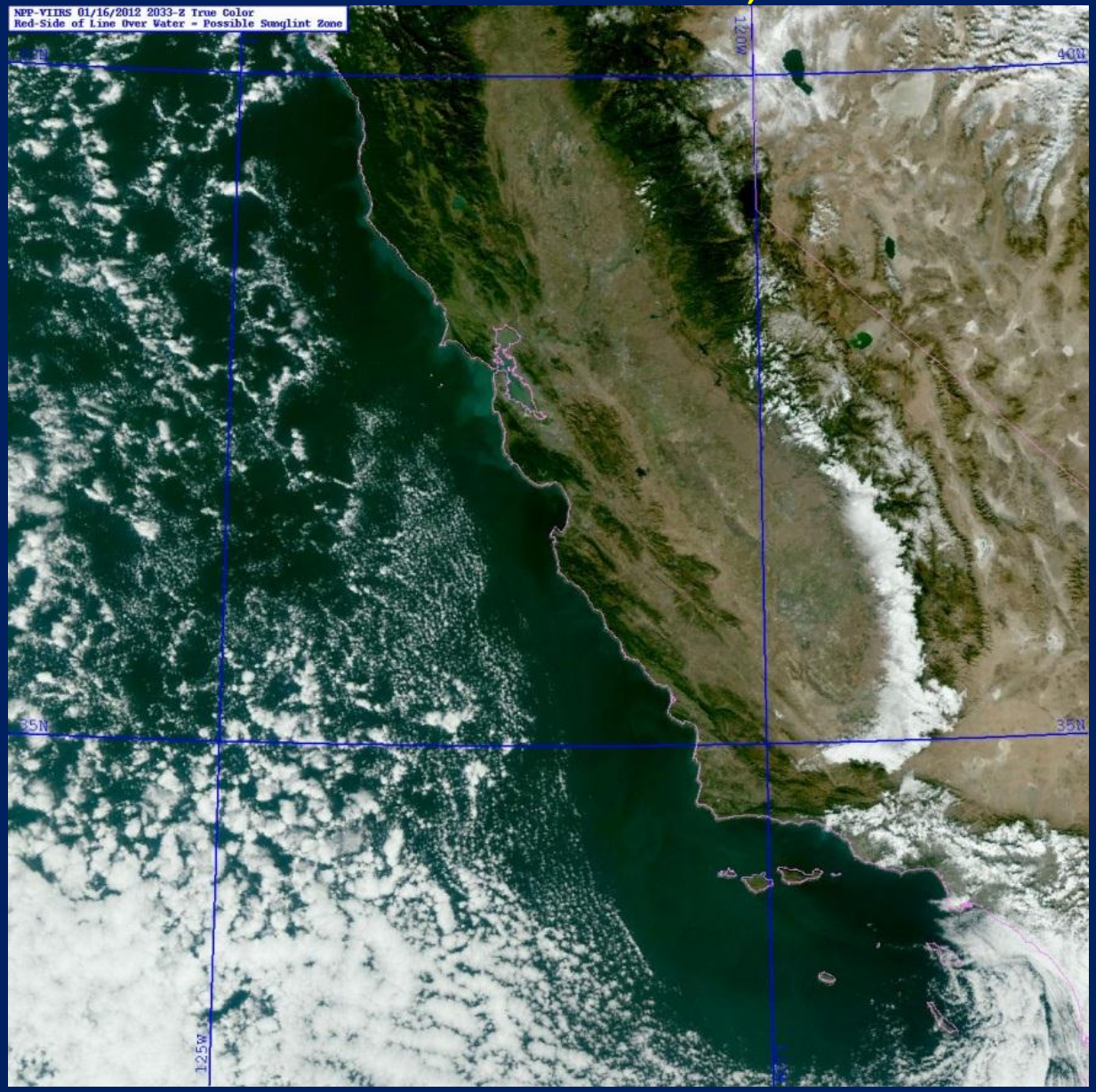


Multi-spectral Comparisons

True color – Southern CA, SW US

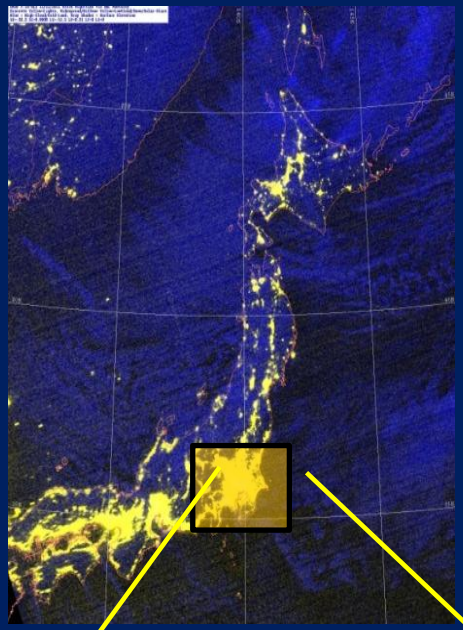
MODIS
2028Z

VIIRS
2033Z



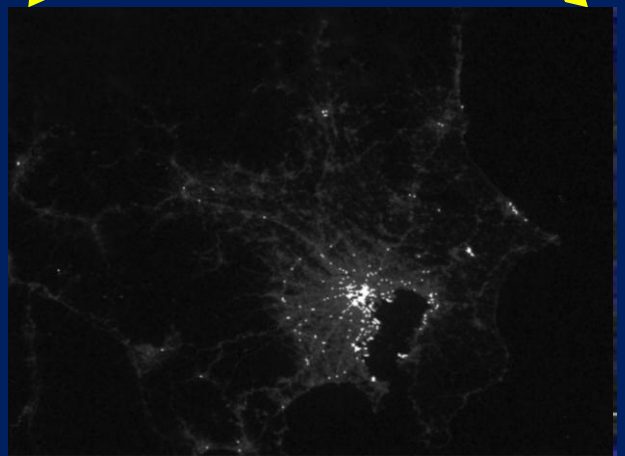
VIIRS Nighttime Visible - DNB

November 21, 2011



DMSP-15
OLS
low light

VIIRS
Day night band

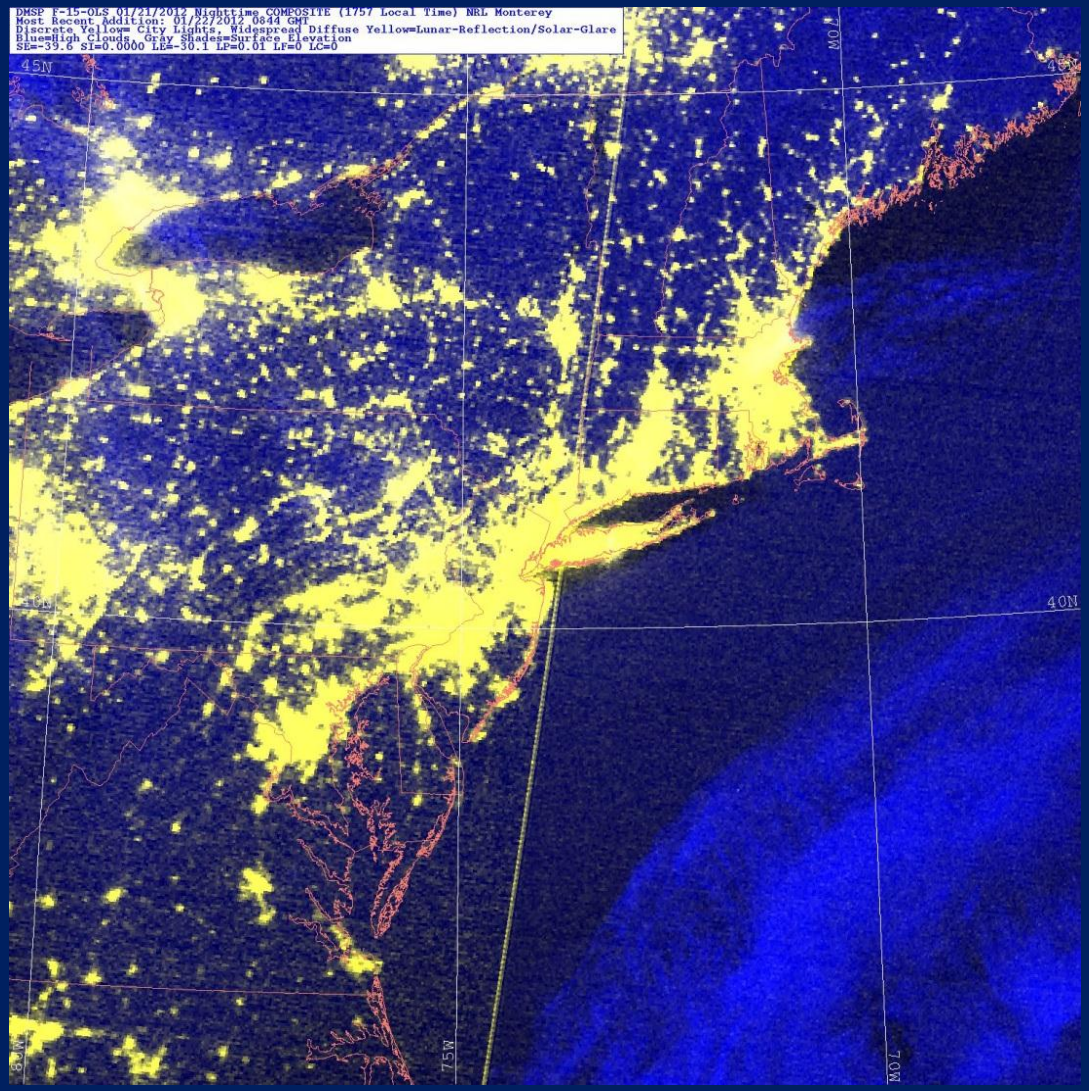


(S. Mills, NGAS)

VIIRS Nighttime Visible - DNB

OLS 08:44Z
DNB 0718Z

Geolocation not corrected

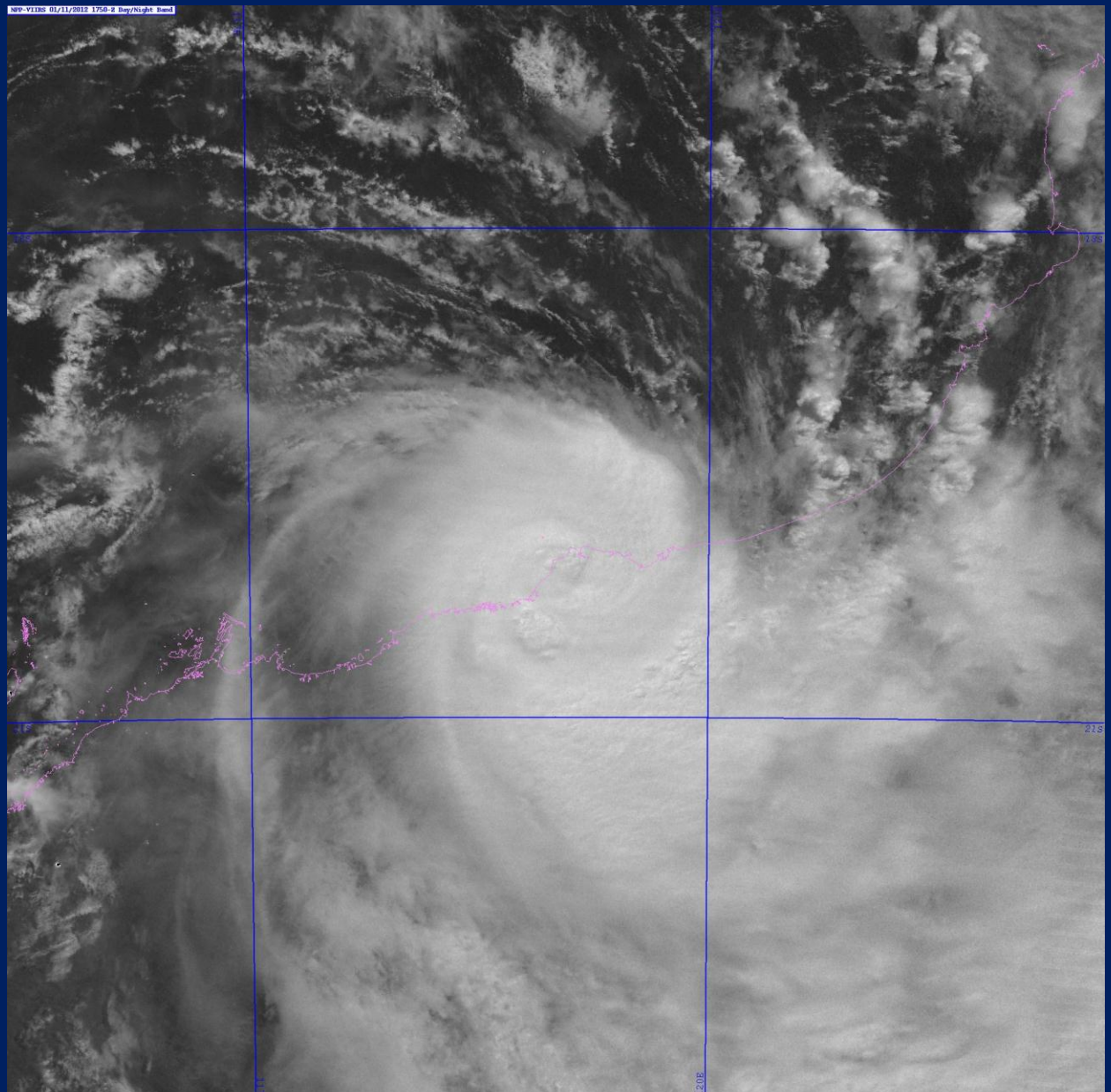


Enhanced city light definition due to spatial resolution and quantization

VIIRS Nighttime Visible - DNB

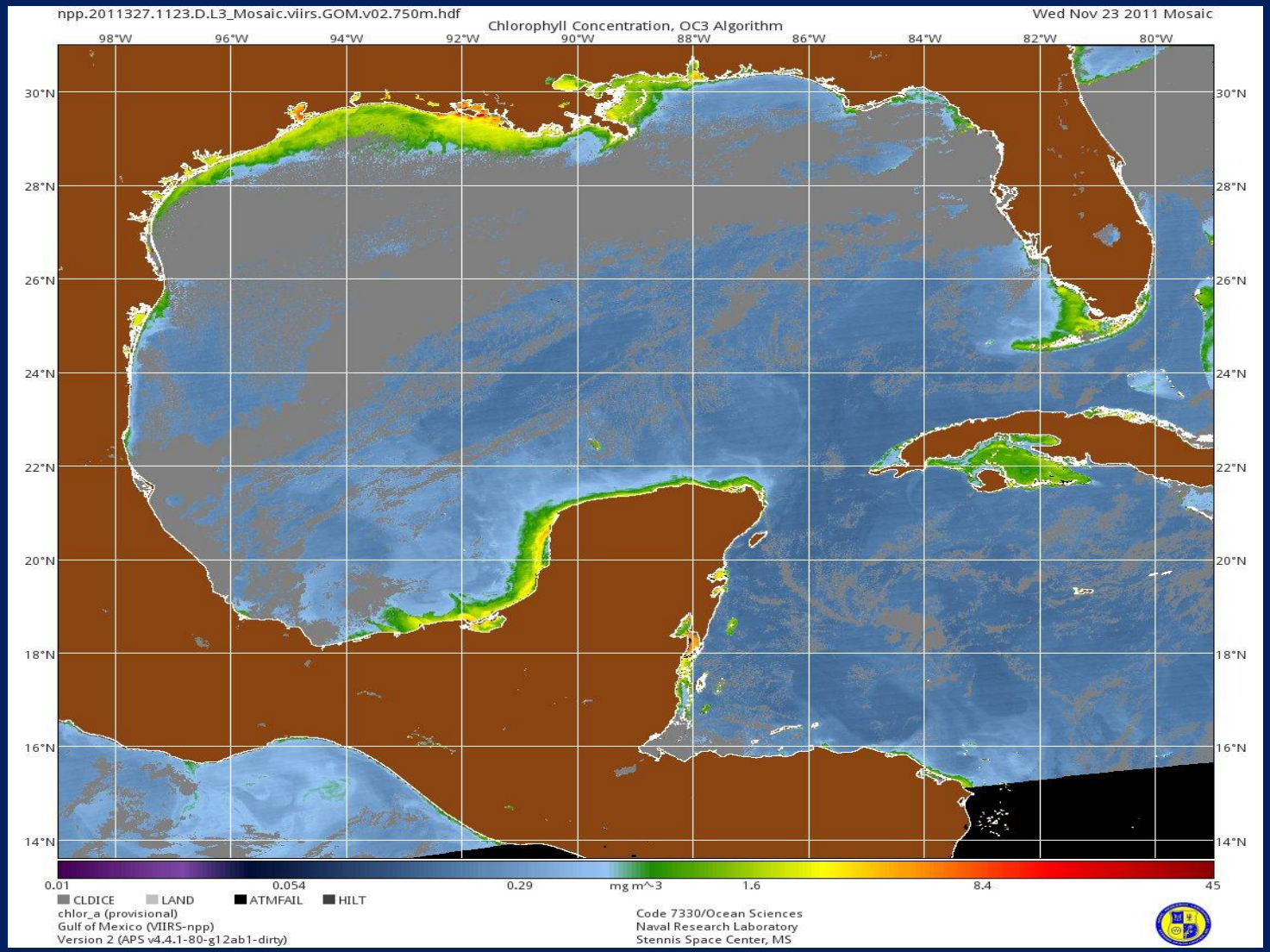
Tropical
Cyclone
06S
Heidi

VIIRS 1750
OLS 2005
OLS 2129



NRL Stennis Ocean Color

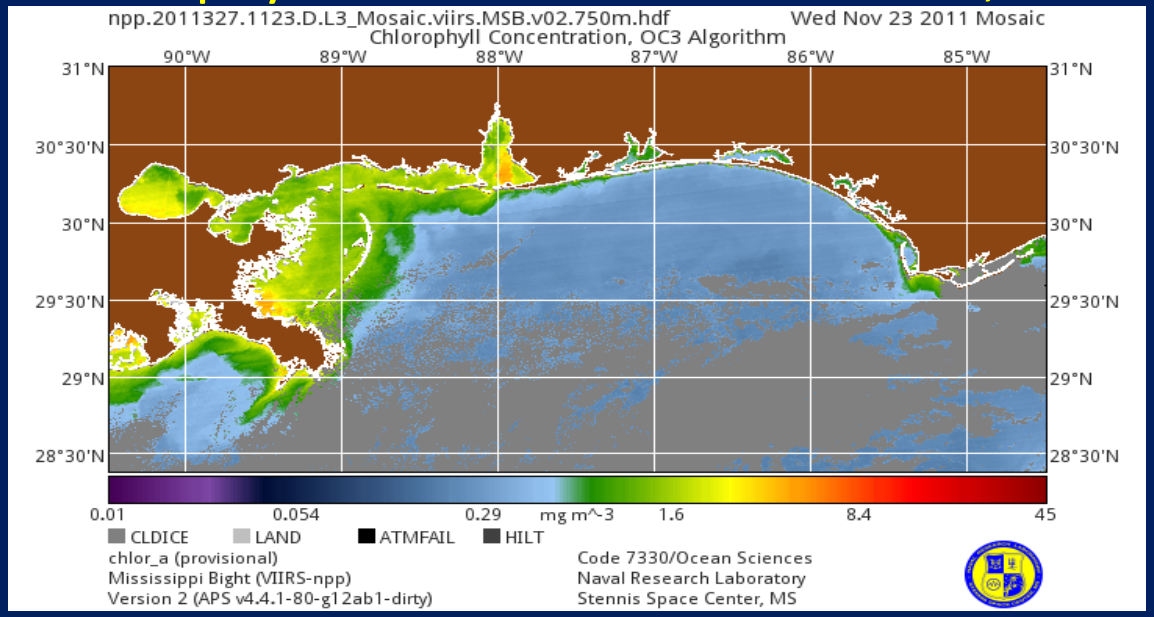
Chlorophyll concentration

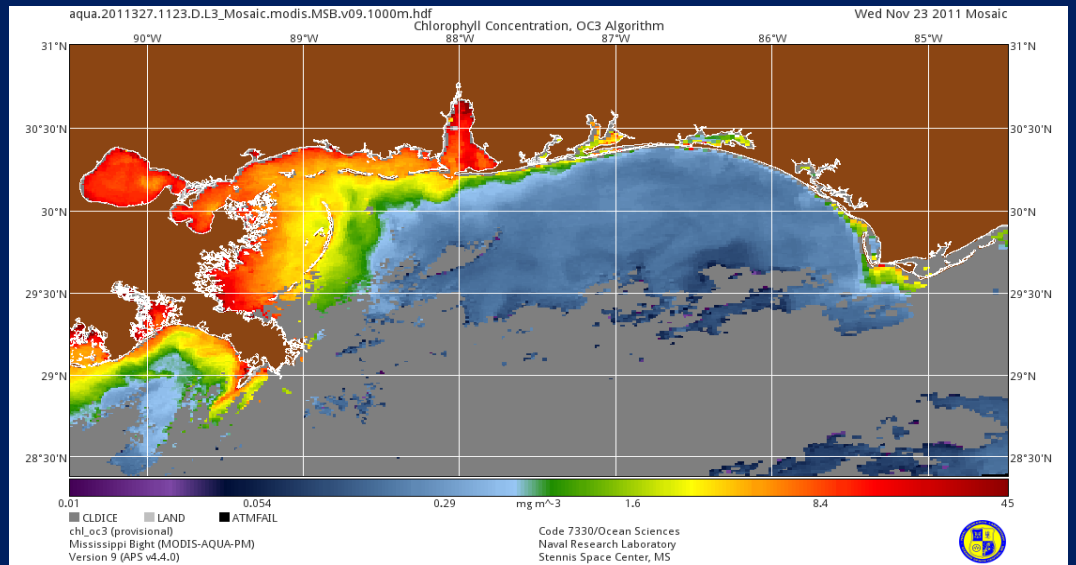


Courtesy: Robert Arnone, NRL-Stennis

Multi-Sensor Comparisons

Chlorophyll – Gulf of Mexico Nov 23, 2011





Courtesy: Robert Arnone, NRL-Stennis

Current/Future Efforts

- Near real time VIIRS products, 7 day on-line data storage
- Comparisons to heritage sensors (MODIS, AVHRR, & OLS)
- Transition from imagery to value-added products
  - Applying "generic processing scheme"
  - DNB: quantifying nighttime features > model input
- Leveraging efforts:
  - NPP cal/val activities
  - Satellite training (NRL, COMET®)
  - Academic/Government agencies
  - (NASA-Sport, CIRA, CIMSS, NRL-Stennis)
  - NWP output: COAMPS®, NAVGEM (Navy Global Environmental Model)