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LOCKHEED MARTIN

NOAA's Suomi-NPP Data Exploitation (NDE) System

Product Integration Made Simple

Environmental Satellite Processing and Distribution System (ESPDS) Development - NDE
NOAA Office of Systems Development
AMS Conference 2013

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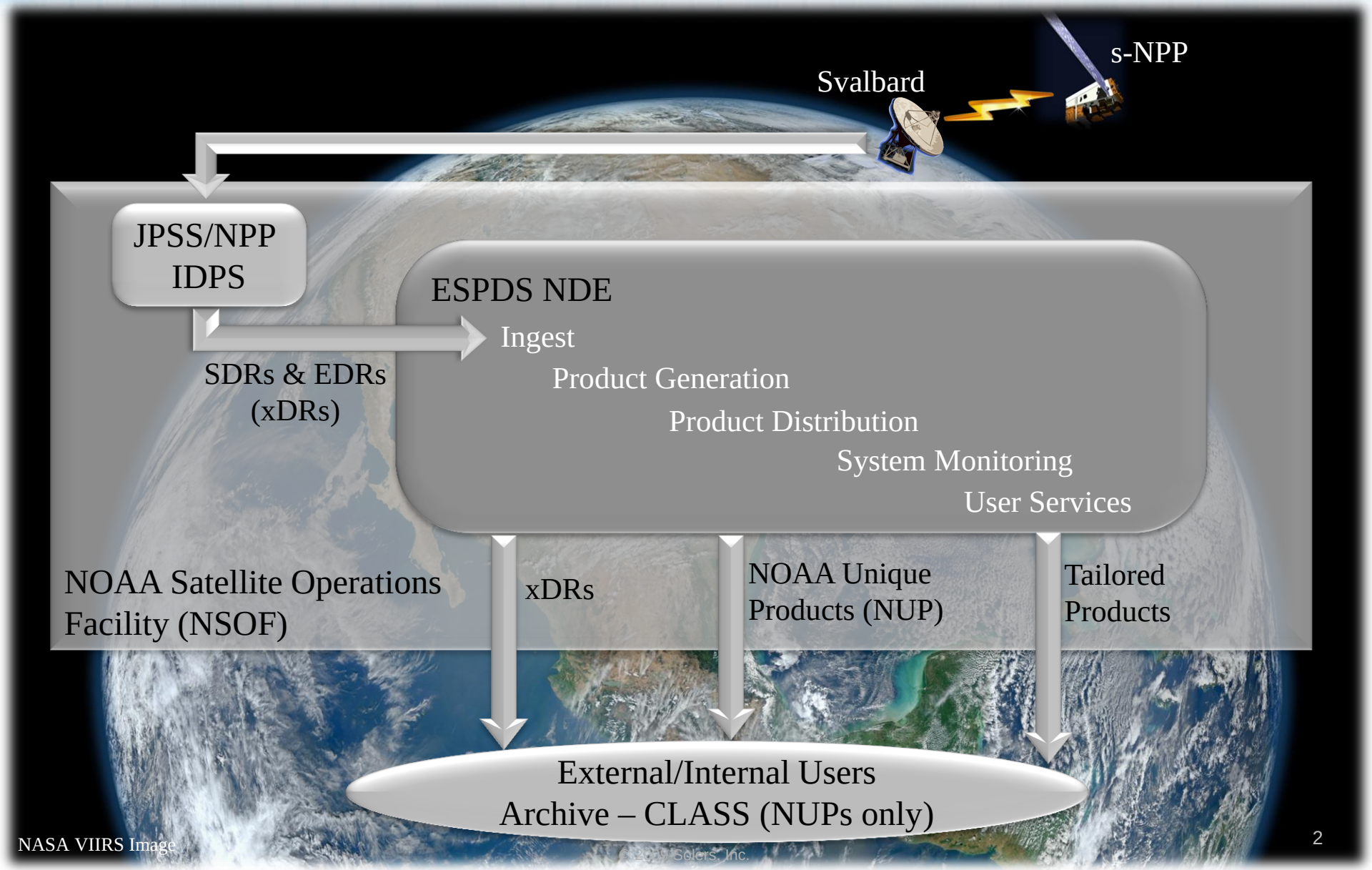
NDE's Perspective of the World



NASA VIIRS Image

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NDE Product Generation

- **NOAA Unique Product (NUP)**
  - Legacy/New satellite products
  - Algorithm development teams from NOAA Satellite Applications and Research (STAR) and University Partners
  - Provide algorithms to NDE via Delivered Algorithm Packages (DAPs)
- **Tailored Products**
  - Product tailoring of NUPs and xDRs
  - NDE tailoring framework provides
    - Aggregation
    - Subsetting (i.e. thinning) files
    - Filtering
    - Reformatting (from HDF5 to netCDF-4 and imagery formats)
    - Resampling (spatial resolution changes)
    - Subsampling
    - Map projection
    - WMO headers
    - Compression

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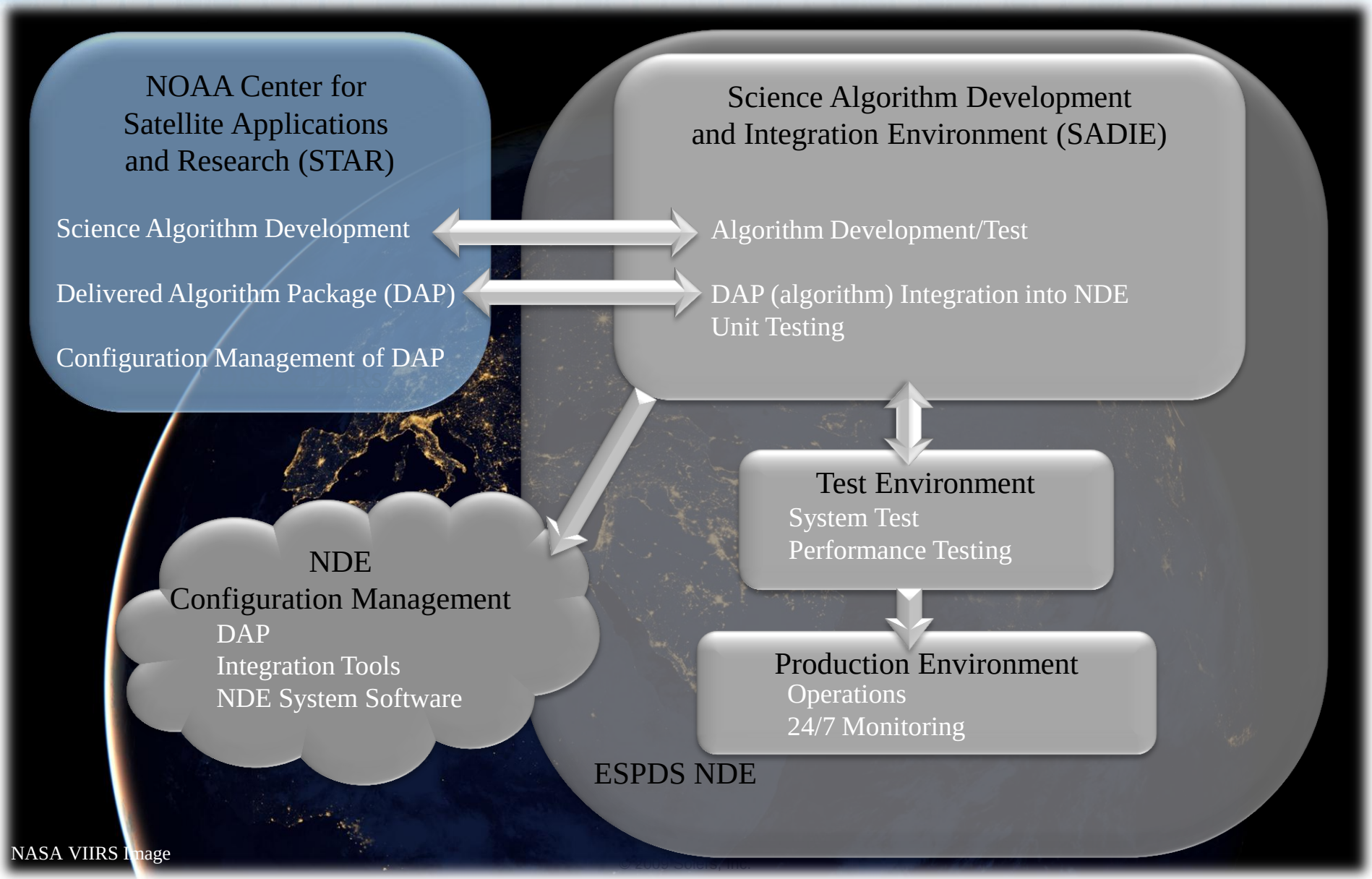
NOAA Unique Product (NUP) Integration Process



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Science Algorithms to NDE Interface

Product Generation Management

- Workflow and data management
- Resource load balancing and management
- Algorithm production rules
  - Control algorithm execution criteria
  - Specify data inputs based on spatial/temporal location, data quality, availability

Working Directory

Working Directory

Working Directory

- Process Control File (PCF)
- Process Status File (PSF)
- Algorithm log file
- Input data

Interface

Science Algorithm

- Read PCF
- Command line execution
- Write output product file names to PSF
- Log warnings and errors
- Return code

NDE VIIRS RGB

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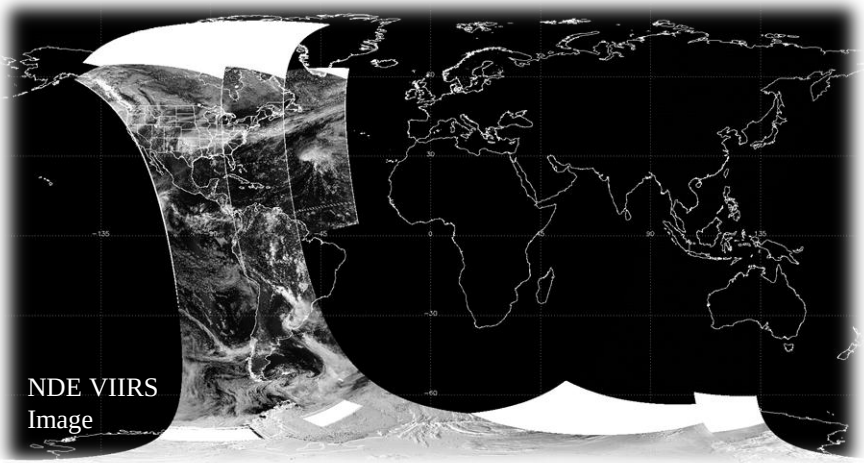
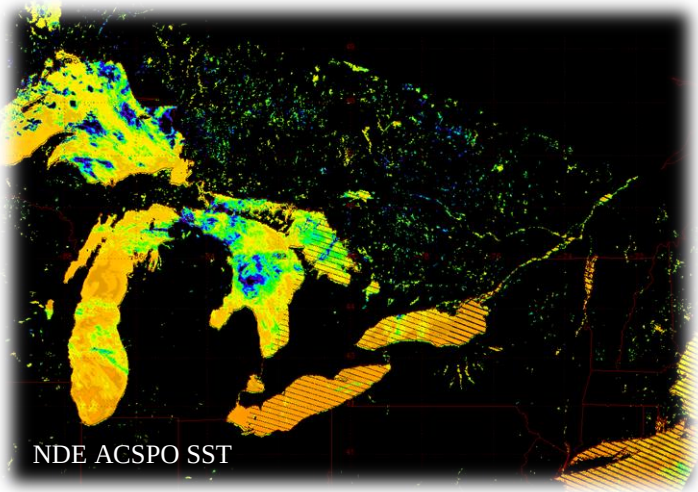
NDE Product Tailoring

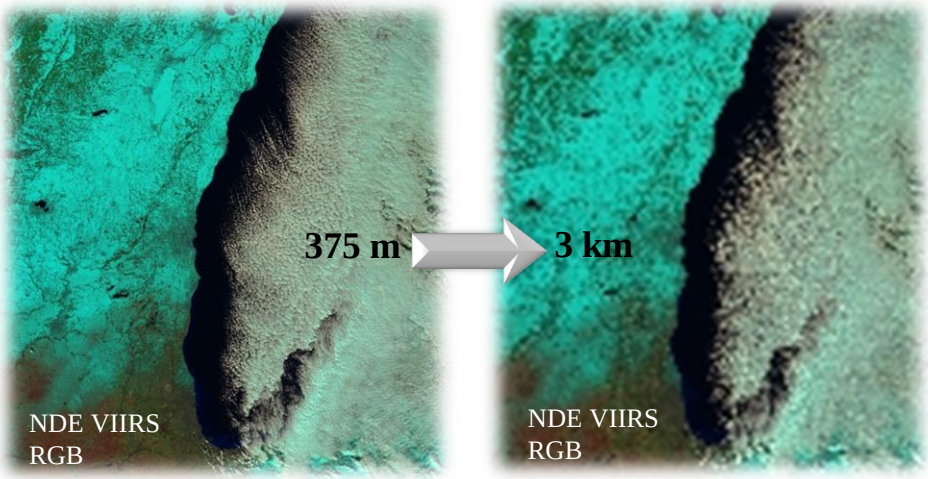
Aggregation



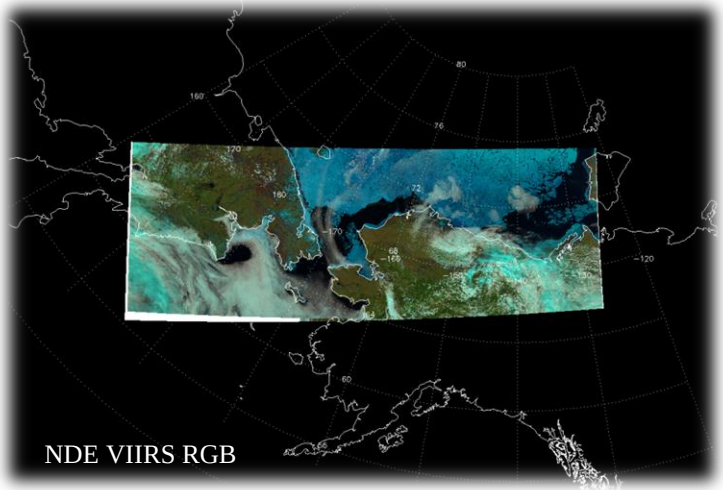
Filtering



Resample



Remapping



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NDE Product Tailoring

- **Reformatting**
  - HDF5 to netCDF4
  - Image formats (JPEG, PNG, TIFF, GEO-TIFF)
- **Subsetting (i.e., thinning data files)**
  - Extract specific data arrays from product files and write to a new file
  - May include data arrays across various products
- **Subsampling**
- **WMO Headers**
- **Compression**
  - GZIP compression of files
  - Internal HDF5/netCDF4 compression of data arrays

National Weather Service AWIPS-II Tailored Product File Sizes

VIIRS IMG EDR	IDPS	NDE Subset – lat, lon, ref	NDE Subsample – GEO lat/lon	GZIP Compression
GEO	445 MB	100 MB	130 KB	
Channel 1	64 MB	25 MB	25 MB	
Total	509 MB	125 MB (61%)	25 MB (91%)	13 MB (95%)

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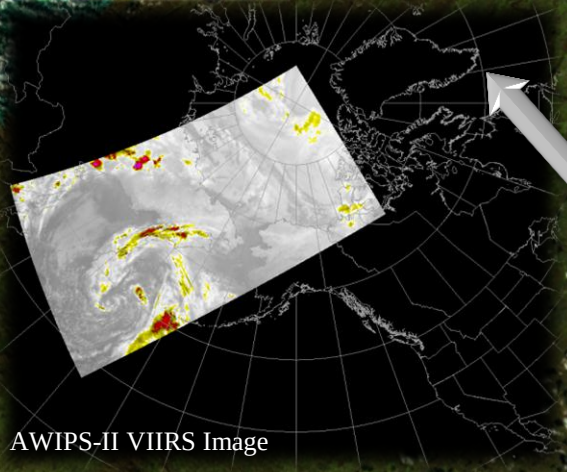
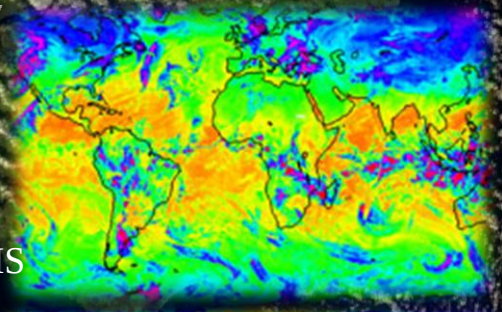
NDE Routinely Delivering Test Products to Critical Users

Alaska Weather Forecast Office (AWIPS-II Stations)

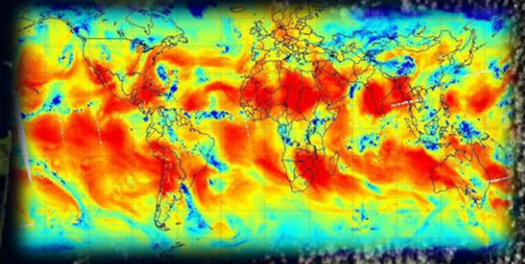


AWIPS-II VIIRS Image

NOAA NCEP/EMC and Eumetsat



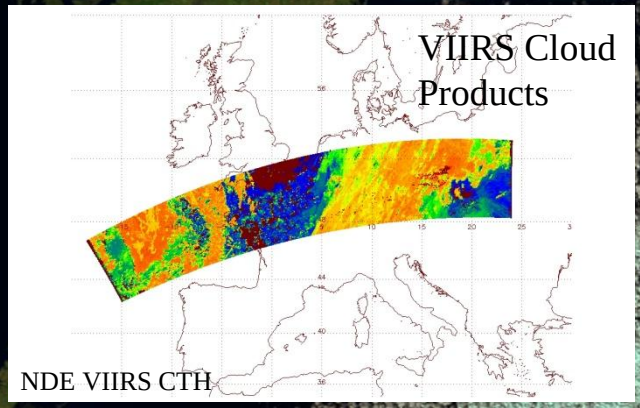
CrIS & ATMS Radiances (BUFR)



Eumetsat

NDE Product Integration

- 3 NUP DAPs and 4 tailored products integrated and routinely producing test products for critical users
- 2 NUP DAPs integrated and in TEST
- 2 NUP DAPs going through integration in DEV
- Over 40 tailored products underway
- Many, many more to come…



NDE VIIRS CTH

NDE VIIRS RGB

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