Updates on operational sounding processing systems at NOAA/NESDIS and the exploitation of hyperspectral Sounder and microwaves sounder data from CrIS/ATMS, IASI/AMSU, and ATOVS

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The current operational polar sounding systems running at the National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite Data and Information Service (NESDIS) for processing the sounders data from the Cross-track Infrared (CrIS) onboard the Suomi National Polar-orbiting Partnership (SNPP) under the Joint Polar Satellite System (JPSS) program, the Infrared Atmospheric Sounding Interferometer (IASI) onboard Metop-A and Metop-B satellites under the program managed by the European Organization for the Exploitation of Meteorological (EUMETSAT), and the Advanced TIROS (Television and Infrared Observation Satellite) Operational Vertical Sounding (ATOVS) onboard NOAA-19 in the NOAA series of Polar Orbiting Environmental Satellites (POES).
In an effort to ensure consistent levels of service and quality assurance for the CrIS/ATMS data the NOAA Unique CrIS/ATMS Product System (NUCAPS) data products, the Office of Satellite and Product Operations (OSPO) implemented and have been performing data quality assurance for the operational sounder and imager products that are being generated. The OSPO operation has facilitated the diagnosis and resolution of problems when detected in the operational environment.
This presentation includes several of these tools developed and deployed for the sounding products monitoring and data quality assurance which lead to improve the maintenance and sustainment of the Environmental Satellites Processing Center (ESPC) processing systems. The presentation includes the discussion on the ESPC system architecture involving sounding data processing and distribution for CrIS, IASI, and ATOVS sounding products. Discussion also includes the improvements made for data quality measurements, granule processing and distribution, and user timeliness requirements envisioned from the next generation of JPSS and GOES-R satellites. There have been significant changes in the operational system due to system upgrades, algorithm updates, and value added data products and services. User requirements for upcoming satellites sounder data products will also be discussed.

NOAA Unique CrIS ATMS Processing System NUCAPS (SNPP)

NUCAPS - Temperature and humidity profiles at 15 US standard atmospheric levels with vertical accuracies of 1 degree Kelvin and 10 % per 1-km layer respectively, water vapor mixing ratio, Ozone mixing ratio, mixing ratio of CO, CO2, CH4, trace gases, and the cloud cleared radiances (CCR) on a global scale.

IASI (Metop-1, and Metop-2)

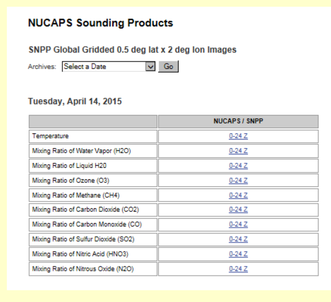
IASI - Temperature and humidity profiles with vertical accuracies of 1 degree Kelvin and 10 % per 1-km layer respectively, water vapor mixing ratio, Ozone mixing ratio, mixing ratio of CO, CO2, CH4, trace gases, and the cloud cleared radiances (CCR) on a global scale.

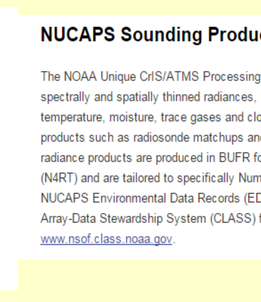
ATOVS (NOAA-19, Metop-A, and Metop-B)

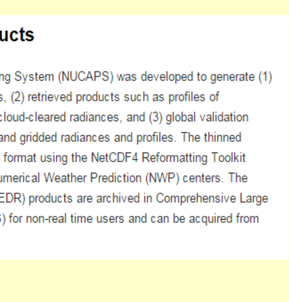
ATOVS - Provides near real-time atmospheric temperatures at 42 levels (from surface to 0.1 mb) and water vapor mixing ratios at 19 levels (from surface to 200 mb) with a 40 km horizontal resolution derived from the AMSU-A and HIRS measurements on board the NOAA polar orbiting and European Metop satellites series.

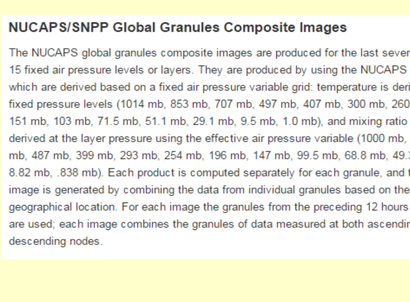
http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/index.html

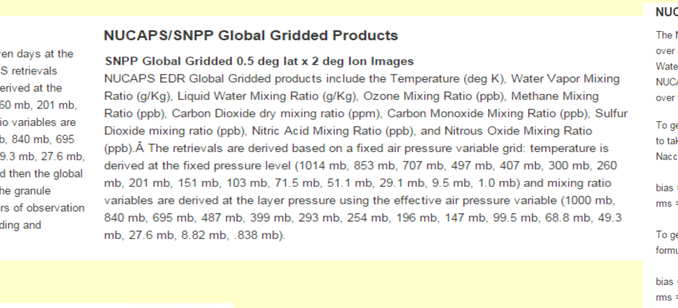
NUCAPS

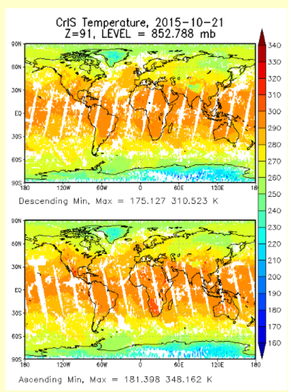


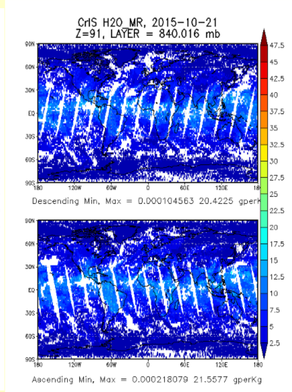


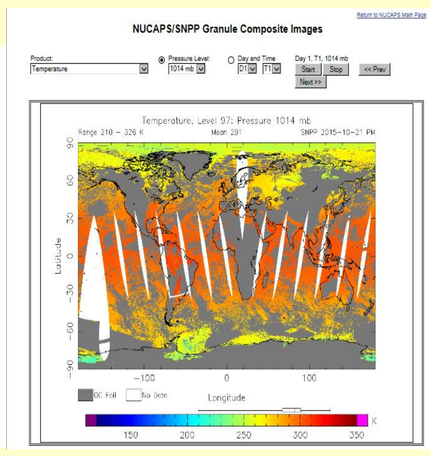


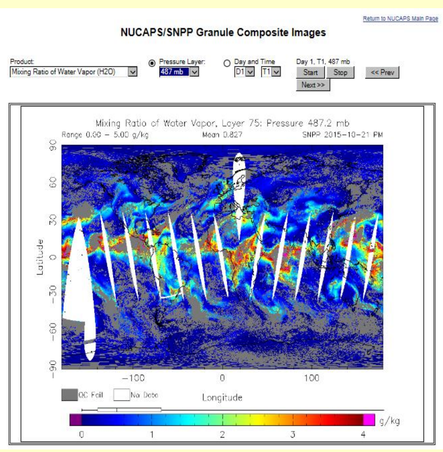


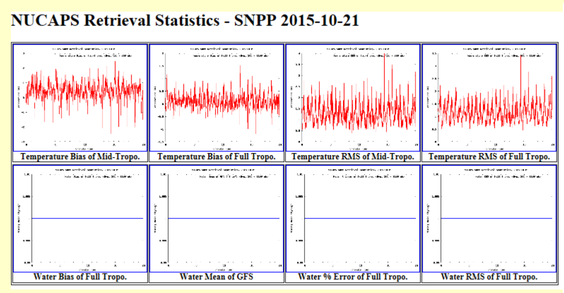


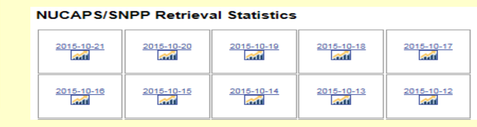


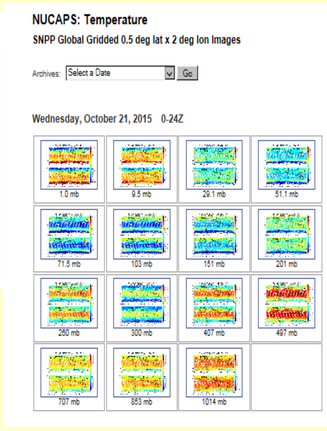










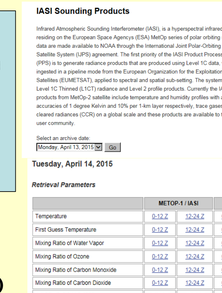


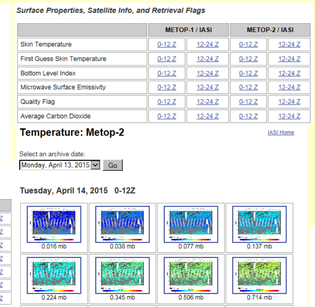
IASI

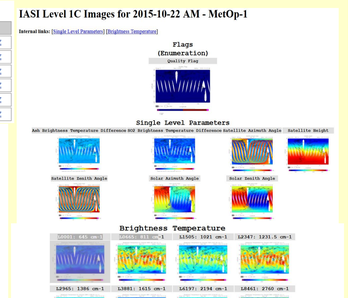
- Temperature profiles
- Water vapor profiles
- Radiances (thinned, clou
- Principal components
- Stability parameters (CAPE, Lifted Index, Convective Inhibition, Pressure of Equilibrium Level, Temperature Level of Free Convection, etc.)
- Cloud products (Cloud Top Pressure, Cloud Top Fraction)
- Trace gases
- Emissivity

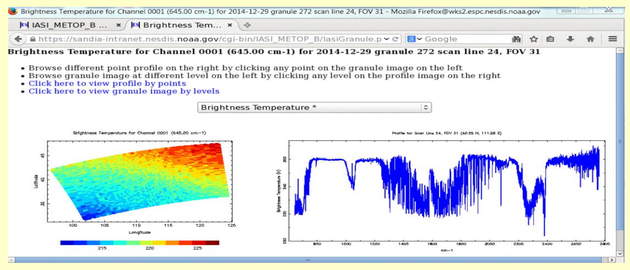
- 100 levels
  - retrieved temperatures
    - First Guess Temperature
    - Mixing Ratio of Water
    - Mixing Ratio of Ozone
    - Mixing Ratio of Carbon Monoxide
    - Mixing Ratio of Carbon Dioxide
    - Mixing Ratio of Methane
- Surface Properties, Satellite Info, and Retrieval Flags
  - Skin Temperature
  - First Guess Skim Temperature
  - Bottom Level Index
  - Microwave Surface Emissivity
  - Quality Flag
  - Average Carbon Dioxide
- SO2 Anomaly
- Ash Brightness Temperature Differences.

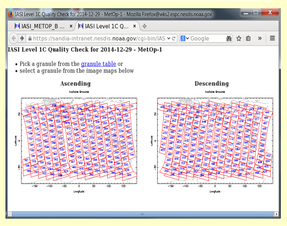
Cloud Top Properties
Cloud top Fraction - 2 Images displayed over two levels
Cloud Top Pressure - 2 Images displayed over two levels
STABILITY Parameters
Stability Parameters - 10 Stability Parameters
Infrared Surface Emissivity - 50 Infrared Parameters
Microwave Emissivity - 7 Microwave Parameters



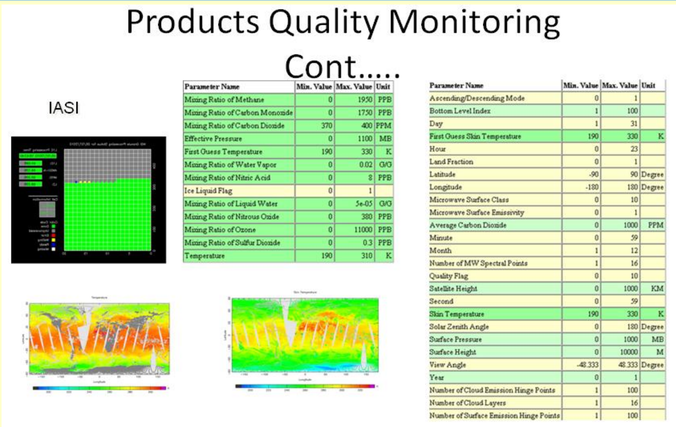


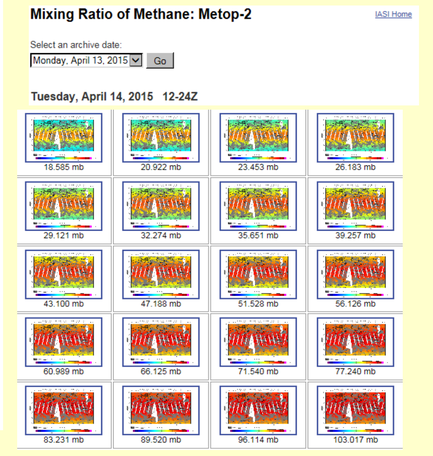


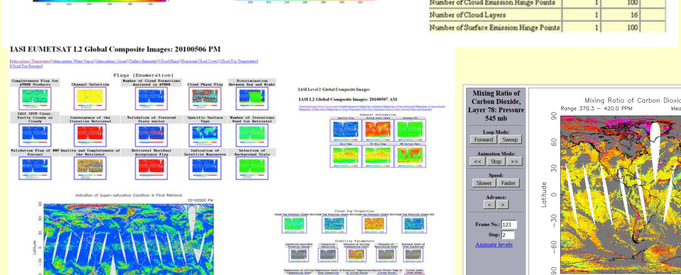


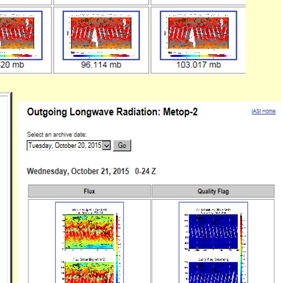


Products Quality Monitoring Cont.....



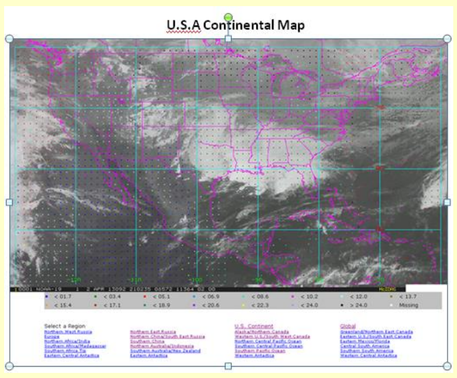


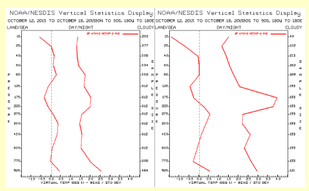


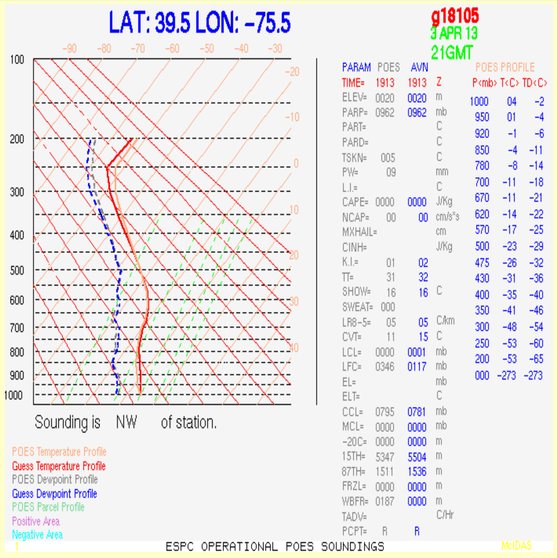


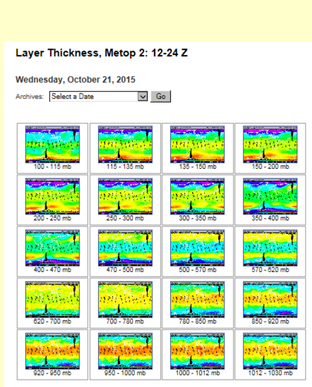
http://www.ospo.noaa.gov/Products/atmosphere/soundings/iasi/index.html

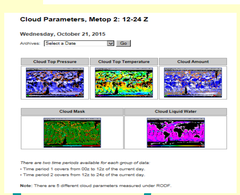
ATOVS

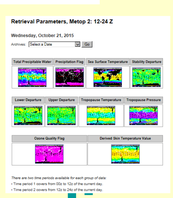


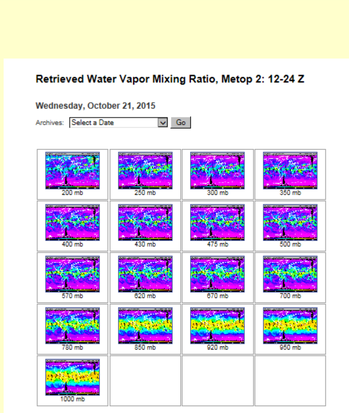


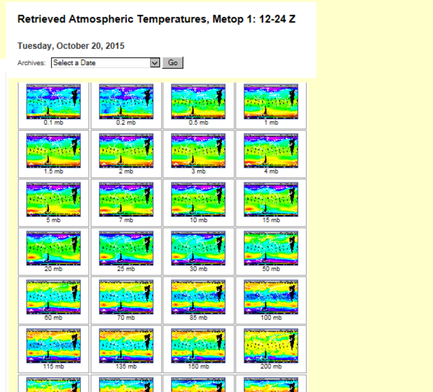












http://www.ospo.noaa.gov/Products/atmosphere/soundings/atovs/profiles/index.html