Exploitation of Hyperspectral Sounder and Microwaves sounder Data Products generated at NOAA/NESDIS

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

The series of advanced operational sounders CrIS, in conjunction with ATMS, provides more accurate, detailed atmospheric temperature and moisture observations for weather and climate applications. Currently, the level 2 data products from S-NPP and IASI from Metop-A and Metop-B satellites include temperature and humidity profiles, trace gases such as ozone, nitrous oxide, carbon dioxide, and methane, and the cloud cleared radiances (CCR) on a global scale and these products are routinely made available to the operational user community. Higher (spatial, temporal and spectral) resolution and more accurate sounding data from CrIS and ATMS support continuing advances in data assimilation systems and NWP models to improve short- to medium-range weather forecasts. In an effort to ensure consistent levels of service for product monitoring and data quality assurance of the NOAA Unique Combined Atmospheric Processing System (NUCAPS) data products, the Office of Satellite and Product Operations (OSPO), has developed and implemented new innovative tools (including webpages for displaying analyses) in the ESPC operation that have made significant improvements in the diagnosis and resolution of problems when detected in the operational environment. The OSPO webpages have been extended to include the CrIS/ATMS SKEW-T (Logarithmic Pressure vs Temperature and Dew Point Temperature) sounding plots over the CONUS region. These pages are updated every hour to show the latest soundings from NUCAPS and IASI.

This presentation will showcase several of these tools that have been developed and deployed for the sounding products monitoring and data quality assurance maintenance and sustainment within the Environmental Satellites Processing Center (ESPC) operational environment. The presentation will also include a discussion on the ESPC system architecture involving sounding data processing and distribution for CrIS and IASI sounding products as well as the improvements made for data quality measurements, granule processing and distribution, and user timeliness requirements envisioned from the next generation of JPSS, Metop-C, 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.

NOAA Unique CrIS ATMS Processing System NUCAPS (SNPP and JPSS)

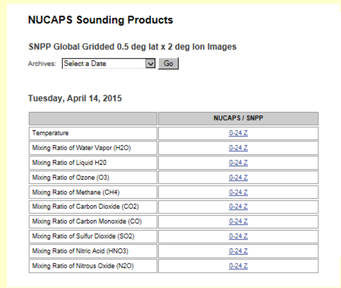
NUCAPS - Temperature and humidity profiles at 15 US standard atmospheric levels with vertical accuracies of 1 degree Kelvin and 10 % per 1-km layer respectively, water vapor mixing ratio, Ozone mixing ratio, mixing ratio of CO, CO2, CH4, trace gases, and the cloud cleared radiances (CCR) on a global scale. These products are derived from the Cross-track Infrared Sounder (CrIS) and Advanced Technology Microwave Sounder (ATMS) currently onboard the Suomi National Polar-orbiting Partnership (SNPP) satellite and later will be available from the Joint Polar Satellite System (JPSS-1 and JPSS-2).

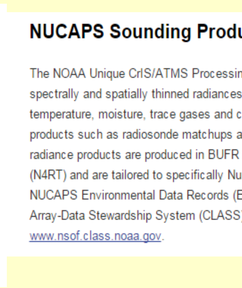
Infrared Atmospheric Sounding Interferometer (IASI) (Metop-A, and Metop-B)

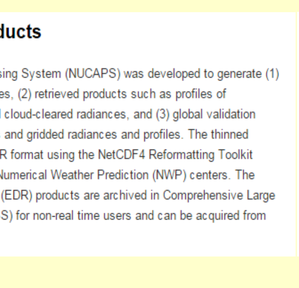
IASI - Temperature and humidity profiles with vertical accuracies of 1 degree Kelvin and 10 % per 1-km layer respectively, water vapor mixing ratio, Ozone mixing ratio, mixing ratio of CO, CO2, CH4, trace gases, and the cloud cleared radiances (CCR) on a global scale. These products are derived from the Infrared Atmospheric Sounding Interferometer and Advanced Technology Microwave Sounder (ATMS) currently onboard the Metop-A and Metop-B satellites and later will be available from the Metop-C

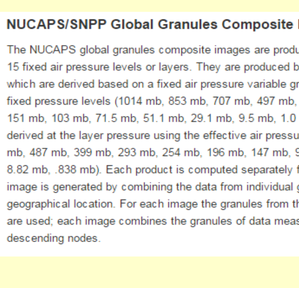
NUCAPS

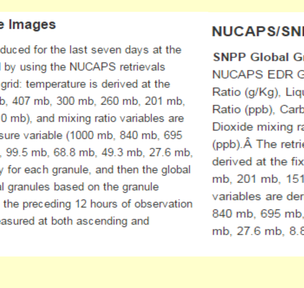
http://www.ospo.noaa.gov/Products/atmosphere/soundings/nucaps/index.html

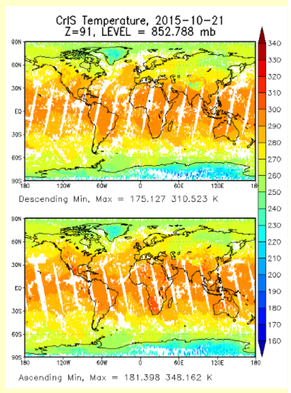


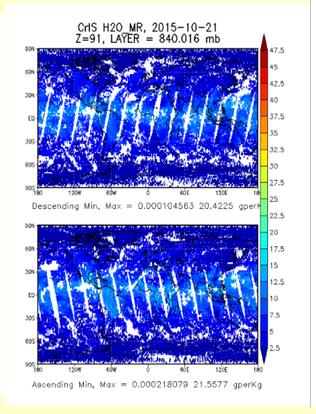


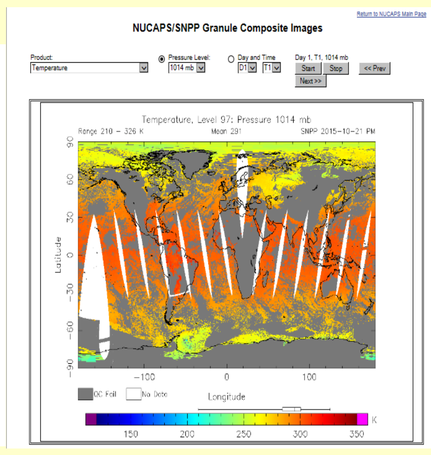


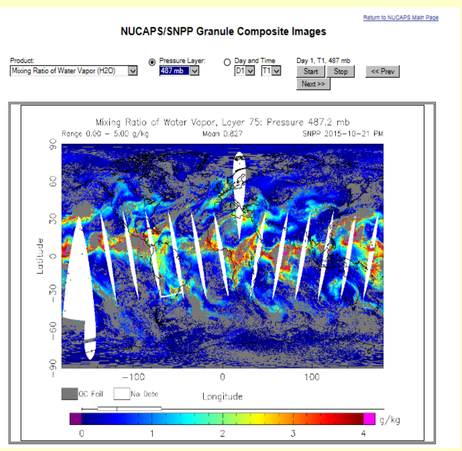


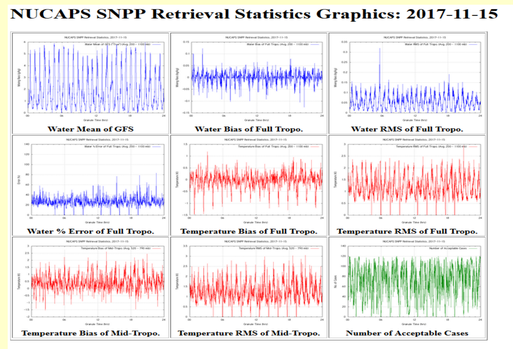


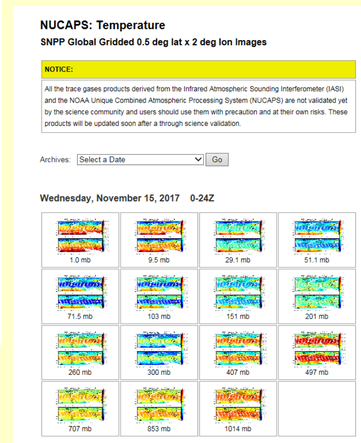












IASI

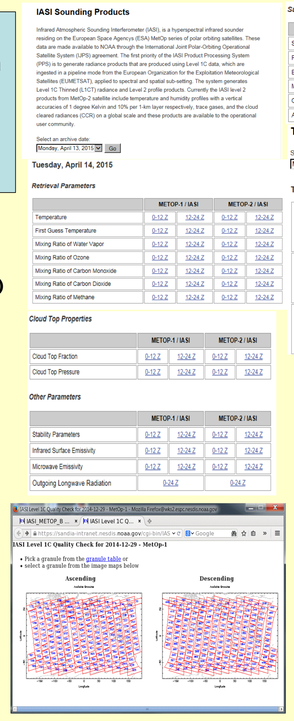
Temperature profiles
Water vapor profiles
Radiances (thinned, clou
Principal components
Stability parameters (CAPE, Lifted Index, Convective Inhibition, Pressure of Equilibrium Level, Temperature Level of Free Convection, etc.)
Cloud products (Cloud Top Pressure, Cloud Top Fraction)
Trace gases
Emissivity

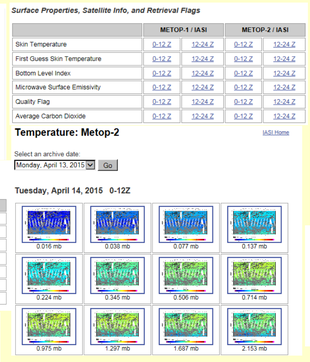
- 100 levels
- retrieved temperatures
- First Guess Temperature
- Mixing Ratio of Water
- Mixing Ratio of Ozone
- Mixing Ratio of Carbon Monoxide
- Mixing Ratio of Carbon Dioxide
- Mixing Ratio of Methane

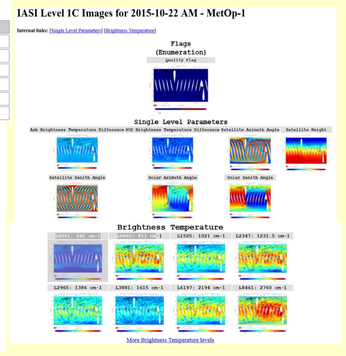
Surface Properties, Satellite Info, and Retrieval Flags
- Skin Temperature
- First Guess Skim Temperature
- Bottom Level Index
- Microwave Surface Emissivity
- Quality Flag
- Average Carbon Dioxide

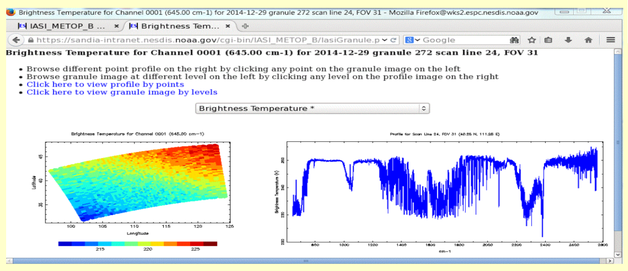
SO2 Anomaly
Ash Brightness Temperature Differences.

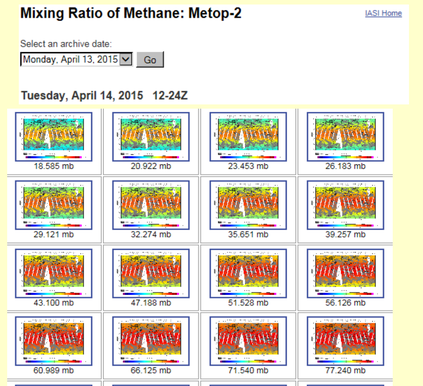
Cloud Top Properties
Cloud top Fraction - 2 Images displayed over two levels
Cloud Top Pressure - 2 Images displayed over two levels
STABILITY Parameters
Stability Parameters - 10 Stability Parameters
Infrared Surface Emissivity - 50 Infrared Parameters
Microwave Emissivity - 7 Microwave Parameters

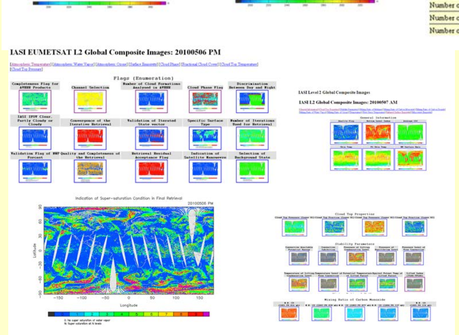


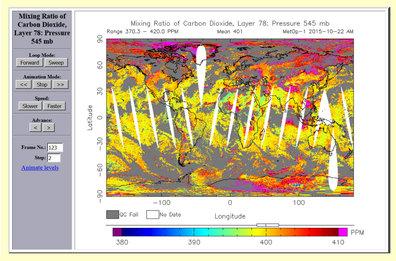


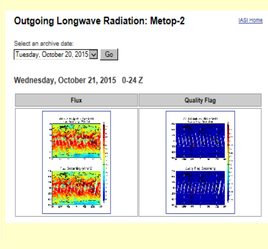








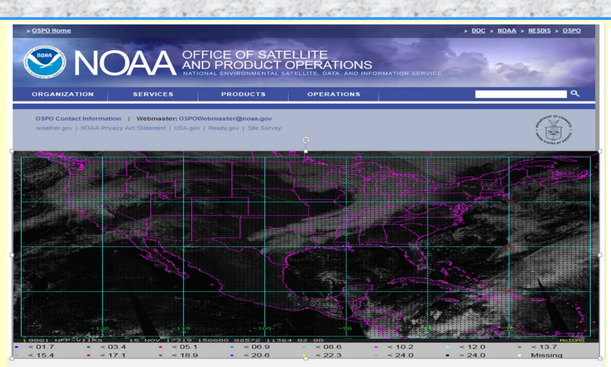


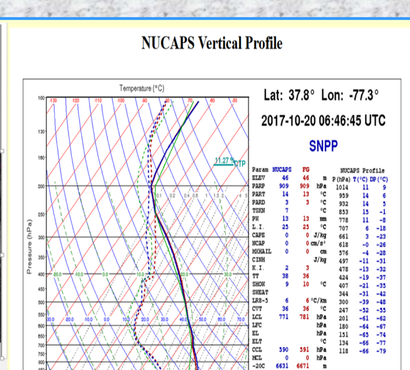


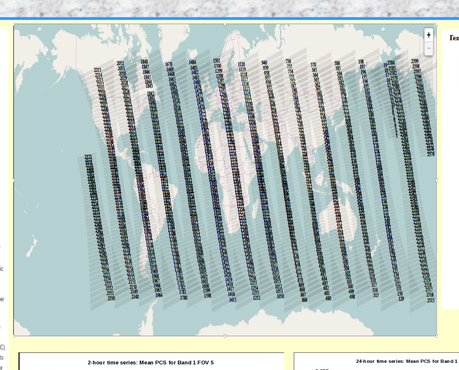
http://www.ospo.noaa.gov/Products/atmosphere/soundings/iasi/index.html

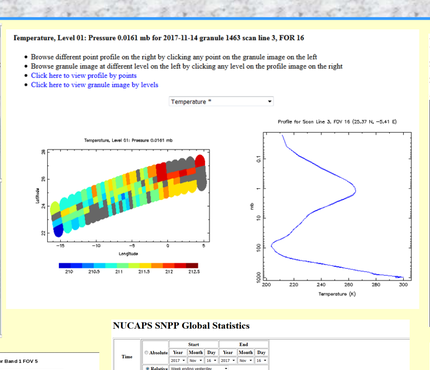
NUCAPS

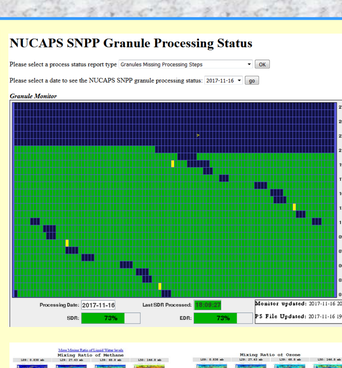
The map is refreshed every hour and the CONUS region is divided into 0.5 degree X 0.5 degree grids. Each grid may contain more than one CrIS FOV but the closest FOV to the center of the grid was selected for sounding. You may be able to select a profile over a grid as shown for the CONUS region.

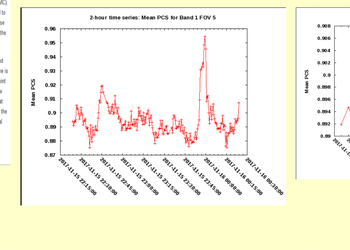


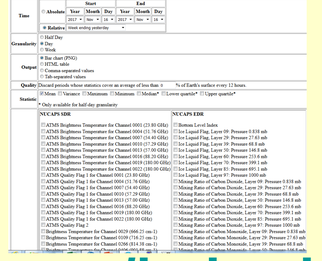












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