A Fully Operational Near Real-Time AIRS Processing and Distribution System: Level 2 Products

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Current NWP AIRS Products
- Thinned Radiance files (HDF and BUFR)
- Types:
  - 324 AIRS channels + AMSU and HSB (11 MB per orbit)
  - 281 AIRS channels + AMSU and HSB (8 MB per orbit)

Near Real-Time Processing Steps
- NOAA receives raw AQUA data from EOS Data and Operations System (EDOS).
- Process AIRS, AMSU, and HSB data to Level 1B (calibrated and unprocessed) 35 GB of data per day.
- Subset Level 1B data and convert to BUFR format to enable distribution on a timely basis.
- Send BUFR files to the NOAA/NESDIS Central Environmental Satellite Computer System (CEMSCS) for distribution to the NWP centers.
- Process AIRS, AMSU, and HSB data to Level 2 products, 12 GB of data per day.

AIRS Processing Milestones at NOAA
- May 4, 2002 – AQUA Launched
- August 7, 2002 – Received Level 0 of Level 1B processing package from JPL.
- October 9, 2002 – Distribution of thinned Level 1B radiance products to NWP centers.
- January 22, 2003 – Visible cloud fraction and top of atmosphere albedo have been added to the thinned data sets.
- July 1, 2003 – AIRS Level 2 becomes operational at NOAA.
- September 11, 2003 – HSB processing and distribution is turned off.
- September 16, 2003 – AIRS reconstructed radiances for 324 channels are available on the NOAA server in BUFR format.

NEW NWP Products
- Thinned Reconstructed Radiance BUFR files (on NOAA server)
- AIRS Level 2 sounding, surface, and cloud products (2004)
- AMSR-E Level 1B BUFR files (Near Future)

Reconstructed and Cloud Cleared Radiances
- Reconstructed Radiance from Principal Component Analysis using 2047 channels.
- 322 of the 324 channels are reconstructed.
- Cloud Cleared radiances are produced from the AIRS operational Level 2 code.
- Cloud Cleared Radiance files will be placed in a BUFR format similar to the AIRS Level 1B BUFR format.

Advanced Microwave Scanning Radiometer – Earth Observing System (AMSR-E)
- AMSR-E is a conically scanning passive microwave radiometer with 12 channels at 6 frequencies.
- 12 Bands: 6.925 GHz, 10.65 GHz, 18.7 GHz, 23.8 GHZ, 36.5 GHZ, 89.0 GHZ
- FOV range from 74 km by 43 km to 6 km by 4 km from a 725 km orbit.
- AMSR-E BUFR Files
- The AMSRE BUFR table is available.
- AMSR-E Level 18 data is stored as "Dock" based on the 89 GHz resolution.
- Test AMSR-E Level 1B BUFR files will be ready by the end of November.
- The Level 2 BUFR files will be available in 2004.

AMSR-E Level 2 Variables
- Rain Products: Rain Rate
- Ocean Products: Cloud Liquid Water, Total Precipitable Water, Sea Surface Temperature, Sea Ice Concentration, Vegetation Water Content
- Land Products: Soil Moisture, Surface Temperature

Processing Hardware
- NASA NPP project has provided to NOAA 96 CPUs (SGI ORIGIN 3800 RS12K) for MODIS and AIRS processing, (24 MODIS, 32 for AIRS, AIRS-E split between the two machines) 8 TB storage
- SGI – 24 x 640 MHz dual processor – 6 TB
- 30 RS10K – 32 RS12K CPUs dedicated to AIRS
- At least 7 TB for AIRS

Atmospheric InfraRed Sounder (AIRS)
- AIRS is a cooled grating array spectrometer.
- Spectral coverage 3.7 to 15.4 microns in 17 arrays with 2178 spectral channels.
- Spectral resolution 2.5 cm-1, 15 km FOV from 725 km orbit.
- AQUA was launched May 4, 2002.
- Primary products: temperature profile (< 1 K accuracy), moisture profile (< 15%), ozone (< 15% layers) and 5% total.
- Accuracy is achieved in clear, cloud cleared, or above clouds.
- Algorithms developed by AIRS science team.
- Details can be obtained from http://www-airs.jpl.nasa.gov