National Aeronautics and
Space Administration
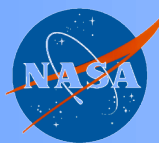
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

AIRS Level 3 and Visualization

AIRS Science Team Meeting
May 3-6, 2005

Stephanie Granger

California Institute of Technology
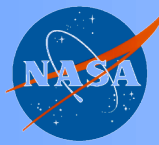
Jet Propulsion Laboratory

06 May 2005

National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Agenda

- **Status**

- **Overview of AIRS L3**

- **Science Users**

- **Sample Visualizations**

- **Showl3 - IDL tool for visualization of L3**

- **Next Steps - v5.0**

- **Level 3 Quantization Product**

- **500 Mb Visualization**

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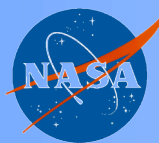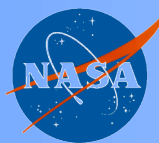California Institute of Technology
Pasadena, California

Status

• **Live in '05!**

- Level 3 Data products are available via the GDAAC
- Thanks to:
  - JPL - Evan Manning, Bob Oliphant, Robert Ando, Quyen Nguyen, Amy Braverman, Eric Fetzer, Stephen Leroy, Sung-Yung Lee, Evan Fishbein, Ed Olsen, Annmarie Eldering, George Aumann
  - GSFC - Joel Susskind, Lena Irredel
  - Beta users

AIRS Level 3 Products

- **Represents Level 2.**
- **Gridded statistical summary of the distribution of corresponding Level 2 parameters for a given time period within a grid cell (1°x1°).**
  - Characteristics
    - Lower volume, less complex than Level 2.
    - Can be used to understand long term, global or large-scale regional behavior.
    - Serves as a guide to corresponding Level 2 data.
      - Aid in identification of interesting regions, time period or artifacts.

AIRS Level 3 Standard Product Specs

- **One degree by one degree equal angle grid**

- **8 day and monthly and daily**

- **Means, counts and standard deviation**

- **Separate Ascending (1:30AM - 1:30AM) and Descending (1:30PM - 1:30PM)**

- **Parameters**

- **Separate MW-only fields included**
  - Temperature, Water vapor (RH and MMR), Geopotential height profiles
    - T profiles: 1000. - 1.0 mb
    - Water vapor profiles: 1000. 100. mb
  - Cloud (height and fraction), total ozone, OLR (Clear and cloudy)
  - Emissivities (MW and IR), Cloud Liquid Water, Surface skin/air temperature
  - MW only Temperature and geo pot height profile
  - Total precipitable water vapor (MW only and MW/IR combined)

- **Special attention was paid to coastline grids**

- **Land/sea mask**

- **Version 4 level 3 can be run on version 3.0 retrievals from DAAC (with some blank fields)**
  - We ran two and one half year long time series - September 2002 - February 2005.
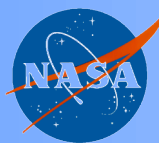
AIRS Science Team Meeting: 06 – may – 05 – SLG
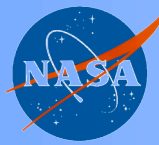
AIRS
Atmospheric Infrared Sounder

Some Level 3 Science Users

- **Duane Walliser, Baijun Tian(JPL, Caltech)**
  - Madden-Julian Oscillation (MJO) Research
- **GENESIS Project (JPL, USC)**
- **Andrew Gettleman (NCAR)**
- **AIRS Science Integration Team (JPL)**
- **Environmental Science Research Institute, Inc. (ESRI)**
  - Applications Research Lab
- **Andrew Dessler (Texas A&M)**
- **Bob Knuteson (UWisc)**
  - Surface Temp validation (over land)
- **Dave Pierce (Scripps)**
- **Joshua (Xiouhua) Fu (University of Hawaii at Manoa)**
  - International Pacific Research Center (IPRC)
  - School of Ocean and Earth Science and Technology (SOEST)

Comparison of v3.0 vs. v4.0 Using L3 SST
(SYL & SLG)
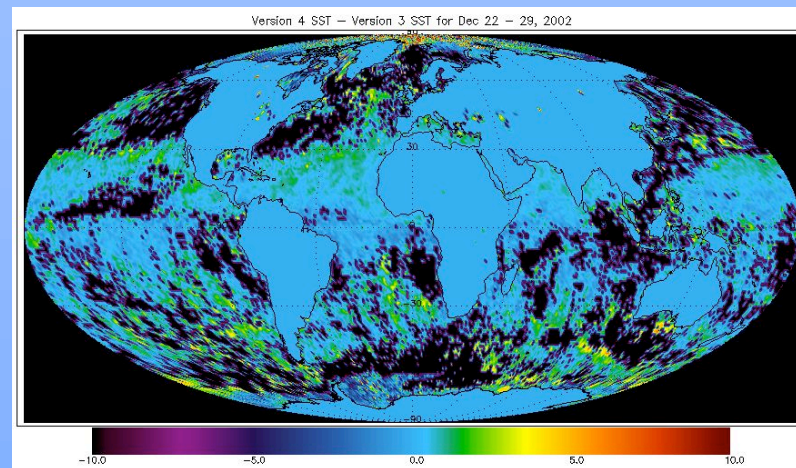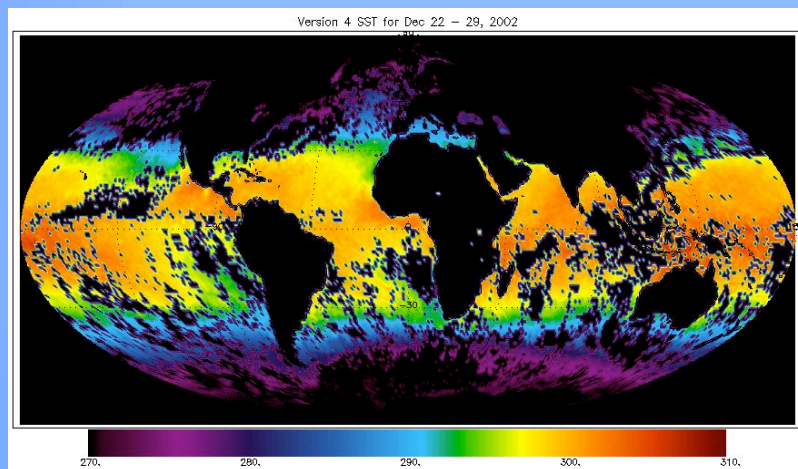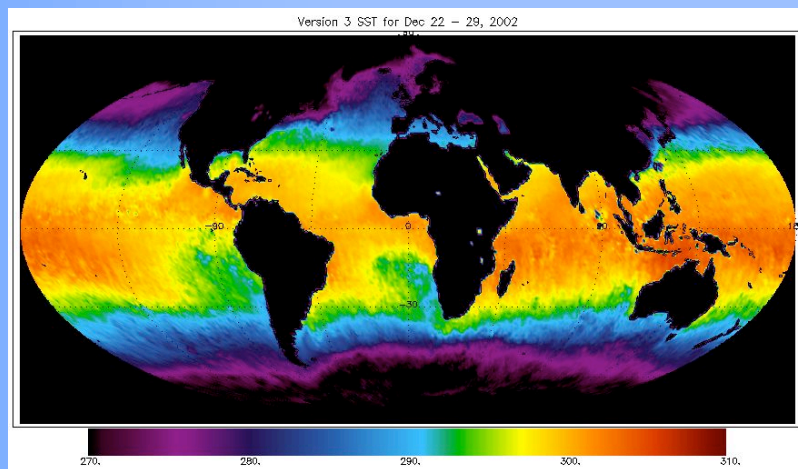
AIRS Science Team Meeting: 06–may–05–SLG
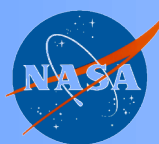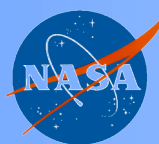
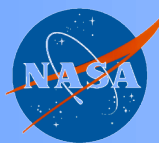# AIRS Level 3 SST - Standard Deviation (SYL & SLG
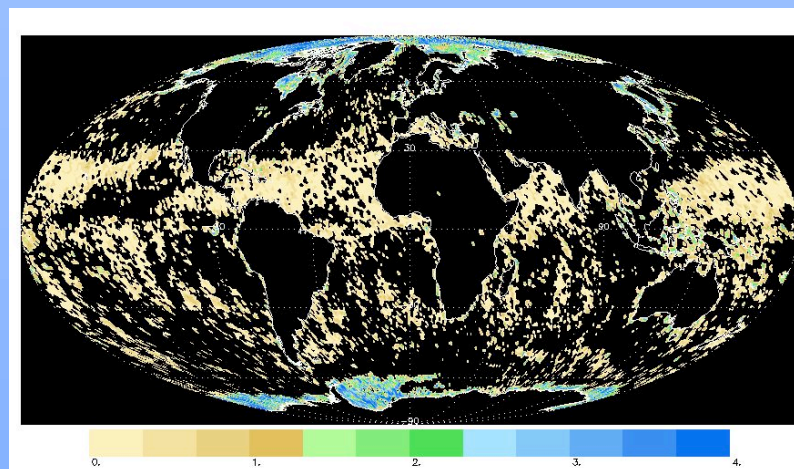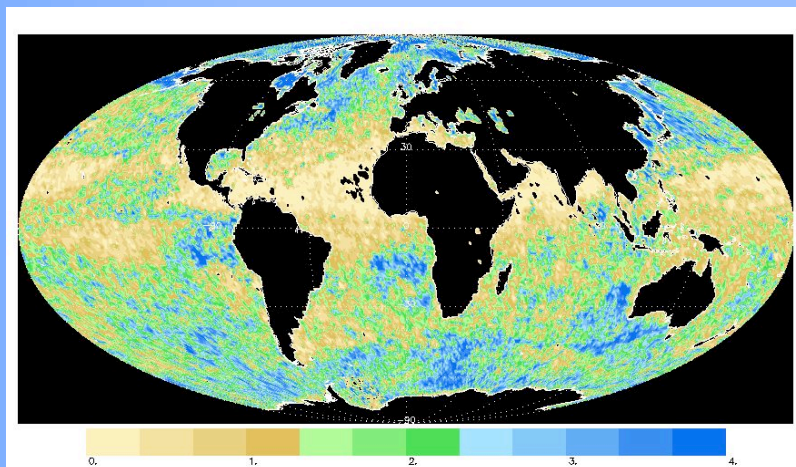
Level 3 Visualization

- **Showl3**

  - Developed by Bob Oliphant

  - IDL tool for visualization of AIRS L3

  - Used to provide quick look capability for AIRS Level 3 products at every level.
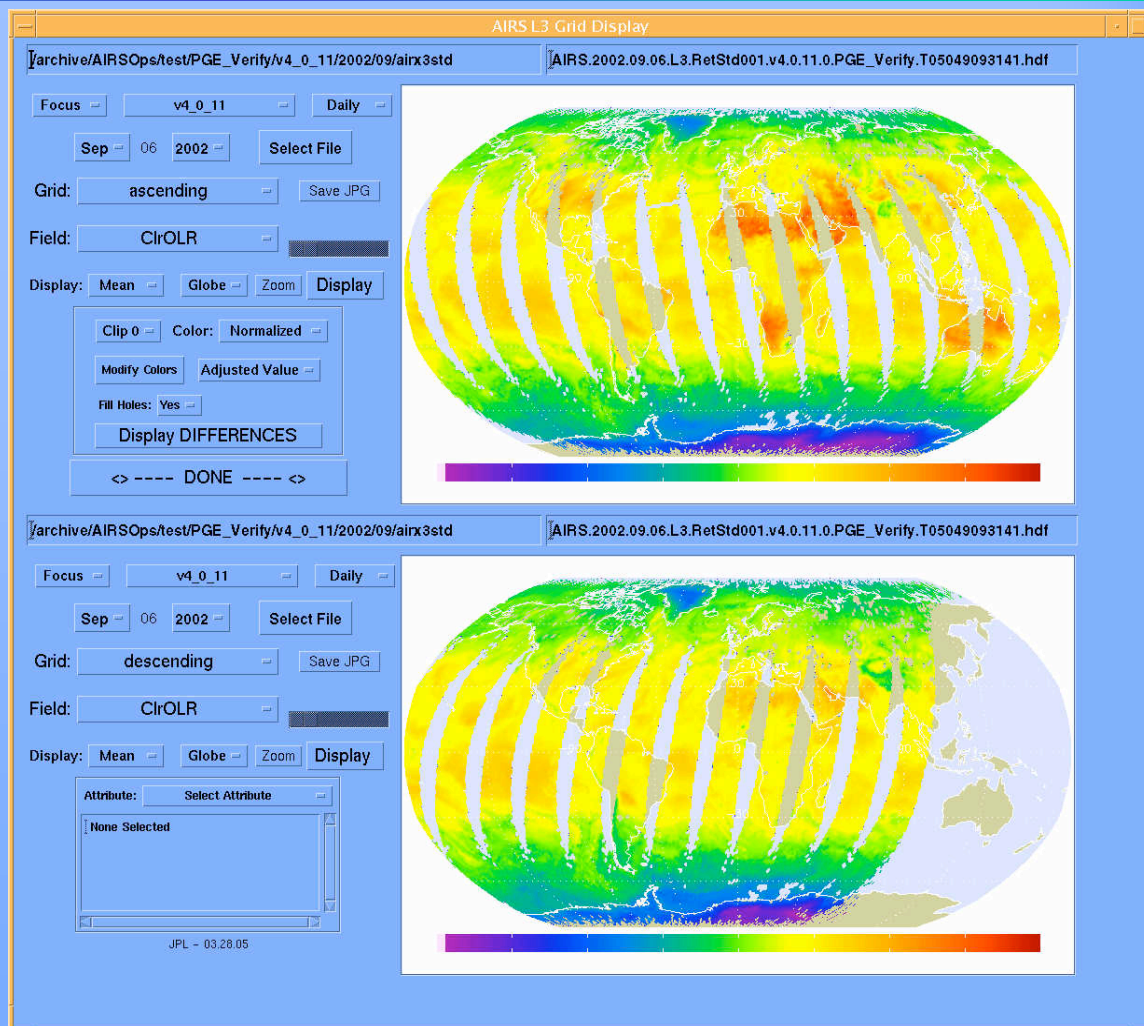
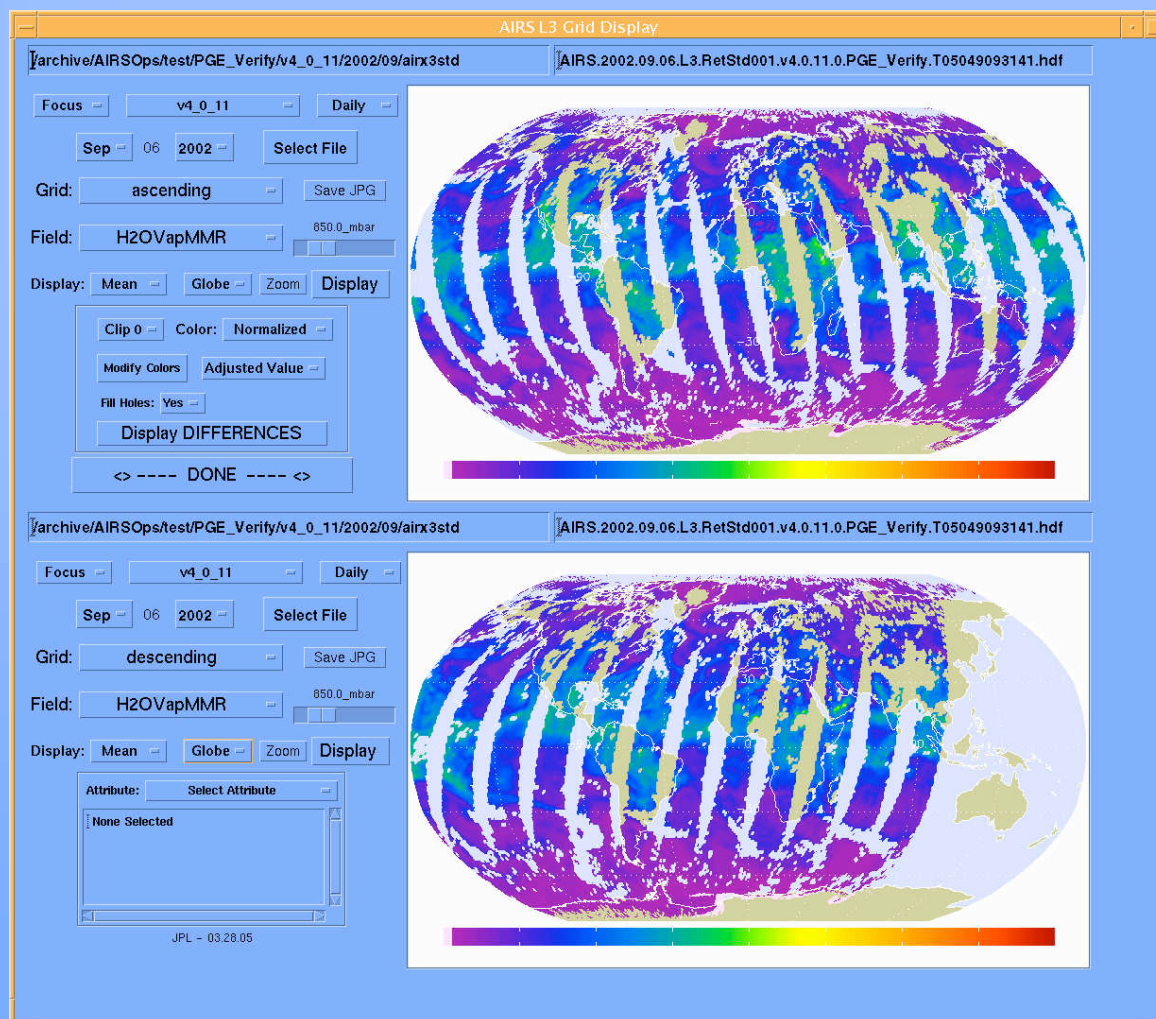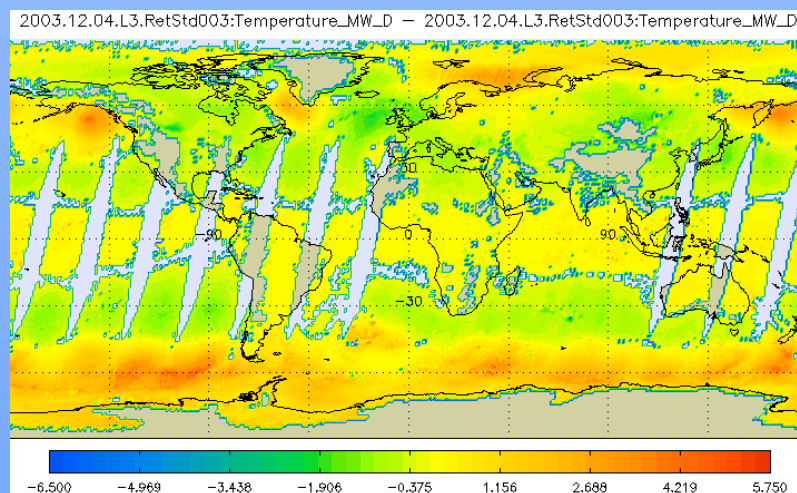*AIRS Science Team Meeting: 06–may–05 – SLG*

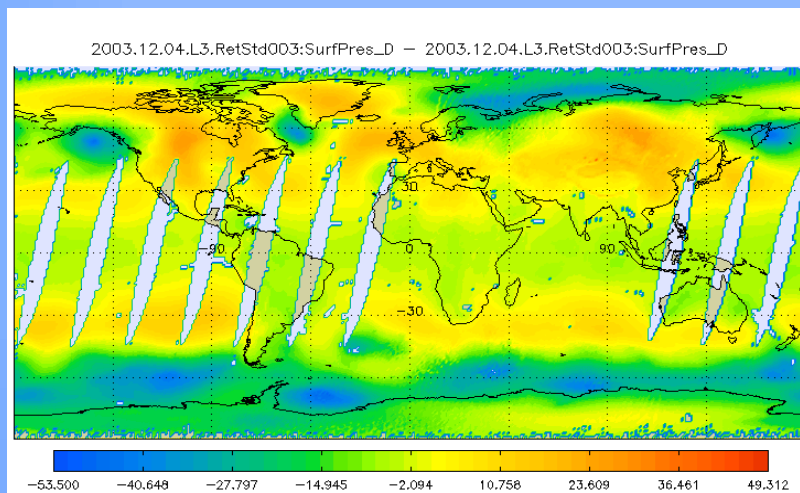# Showl3 - multiple pressure level capability
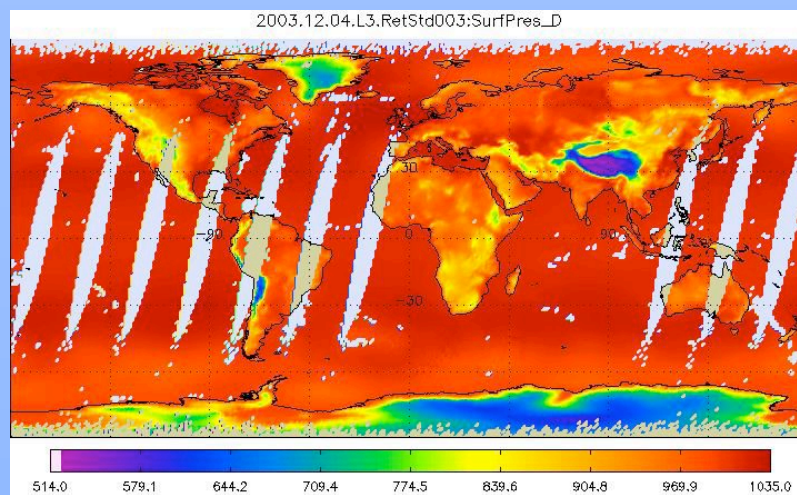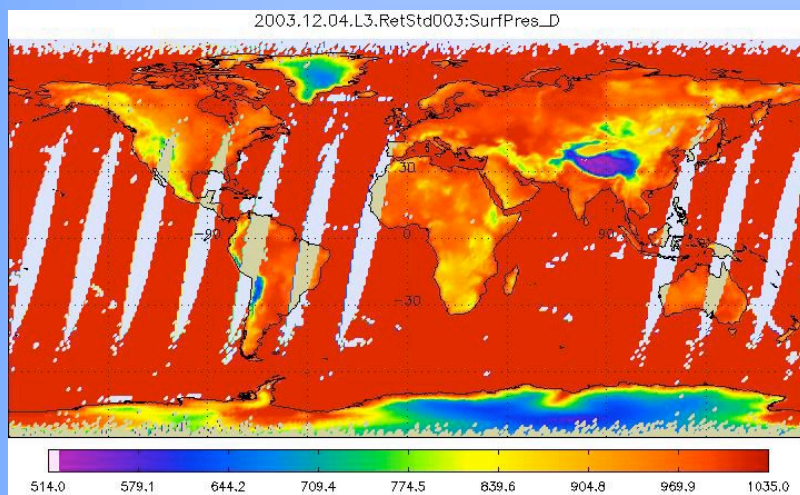
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AIRS Science Team Meeting: 06–may–05 – SLG

Verification of algorithm using Level 3

AIRS Science Team Meeting: 06-may-05-SLG
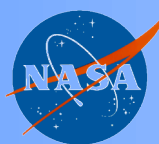
Animation using 8-day Level 3 product

AIRS Temperature (500 mb): 8 Day

AIRS - 01/02/2004
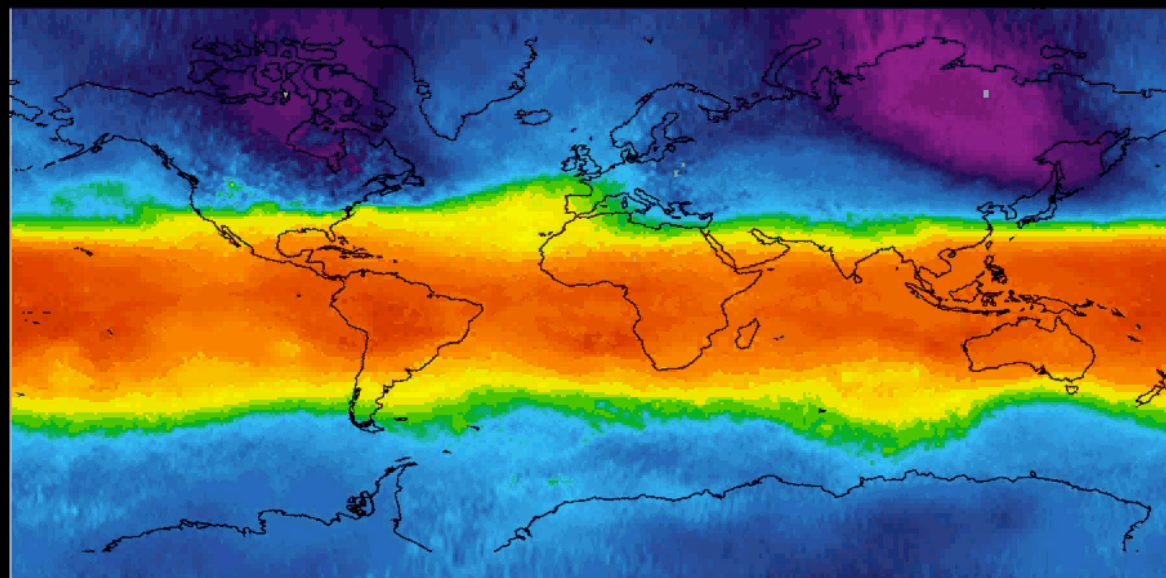
Degrees Kelvin

National Aeronautics and
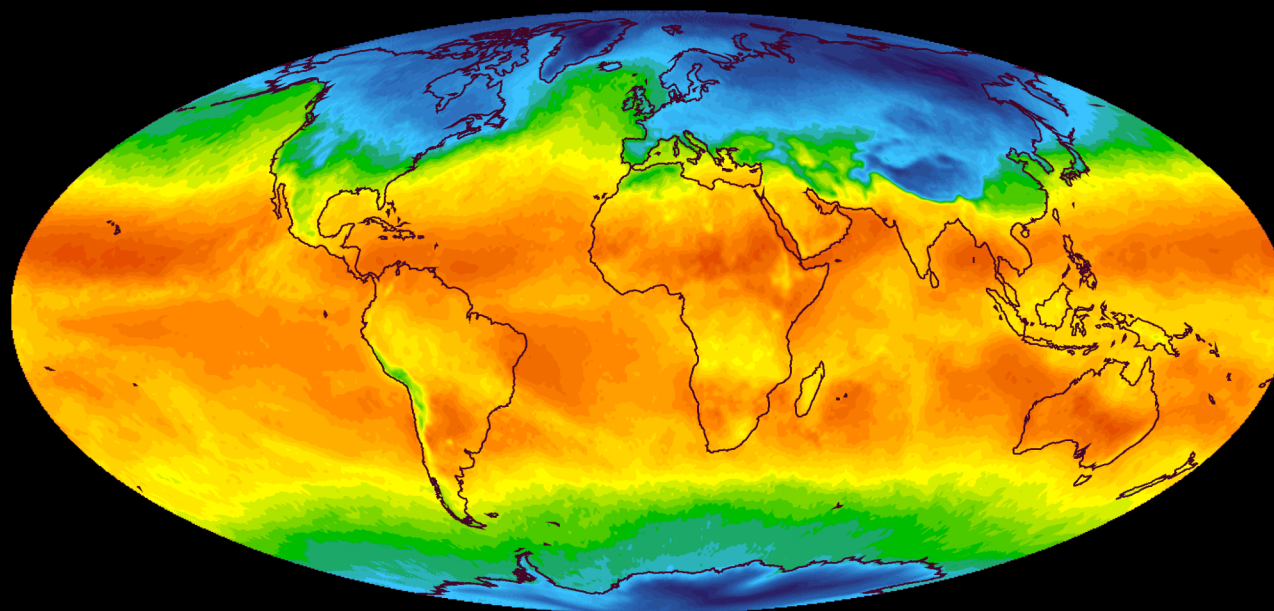Space Administration

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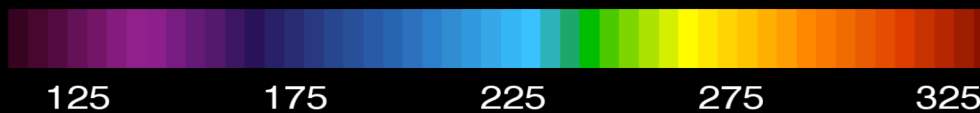**AIRS Level 3 Product
8-Day (from v3.0 L2)**
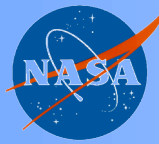
Mean Clear Outgoing Longwave Radiation

AIRS Level 3 - January 07 - 14 2003

Watts/m**2

125   175   225   275   325

National Aeronautics and
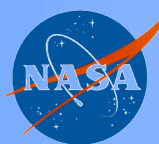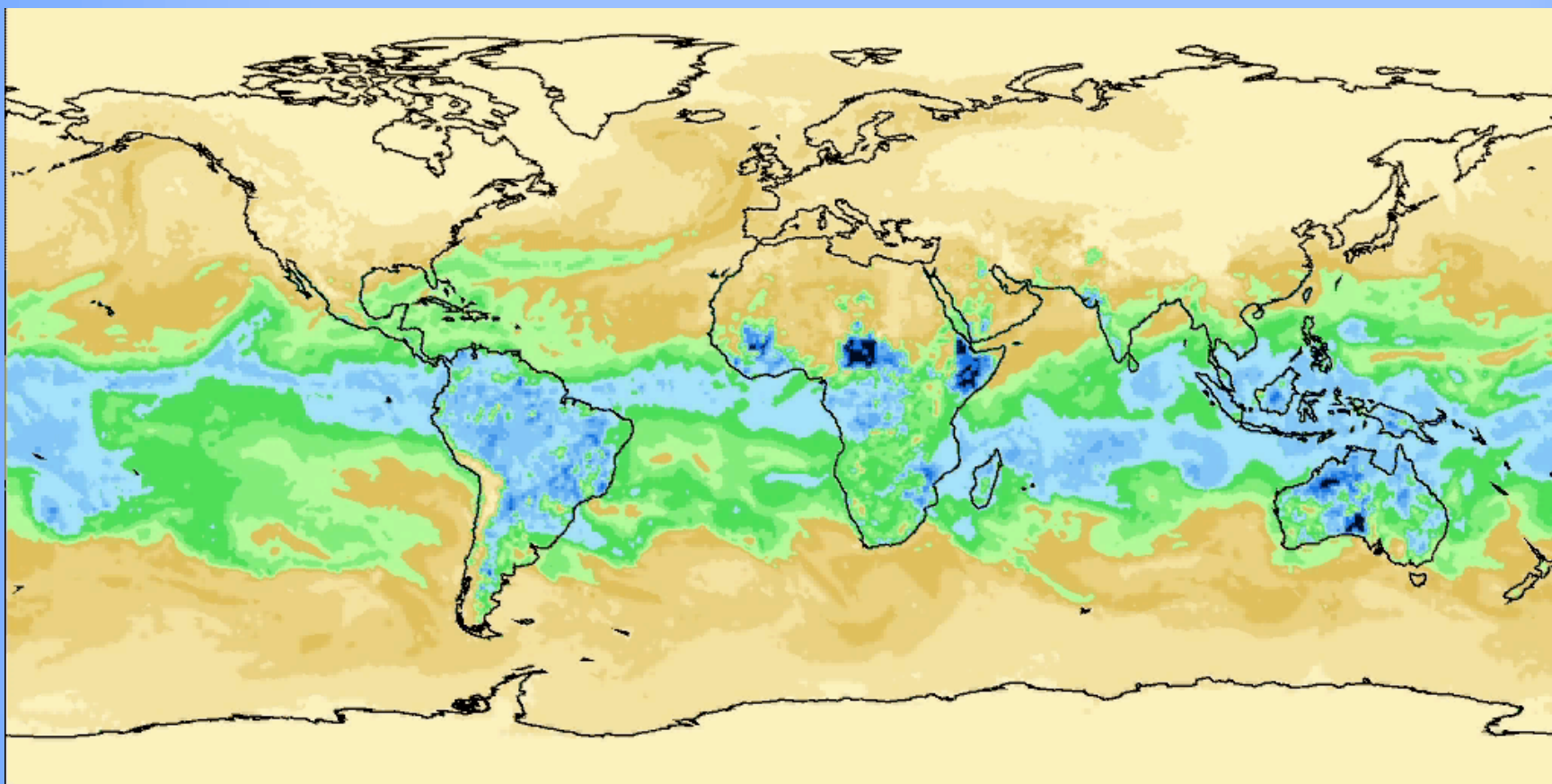Space Administration

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To do

- **V5.0**
  - Level 3 Standard
    - Science Team Input
    - O3 Profile
    - T profiles v H2O profiles in a grid cell
      - Because of QA, different T profiles and H2O profiles
      - Difficult to analyze relationship between them.
    - Exploratory
      - Cloud profiles
      - L3 weighted by error estimates
      - ATOVS compatibility
  - Level 3 Quantization
    - Quantized Level 3 product that takes into account the non-Gaussian distribution within a grid cell through cluster analysis.
    - Prototype done
    - Questions? Amy.Braverman@jpl.nasa.gov

Integrated WV - 1000 - 500 Mb
(Sept 2002 - Feb 2005)