National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS Project Overview

T. Pagano
NASA JPL

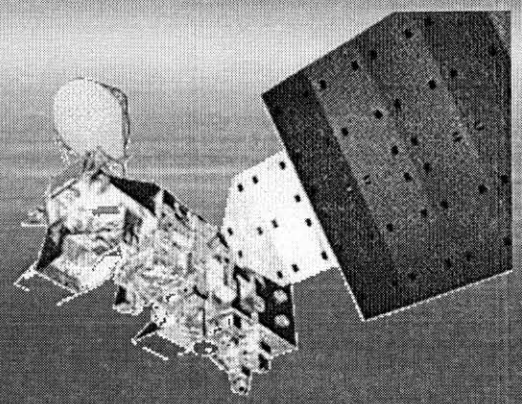
## AIRS Science Team Meeting

November 30, 2004

National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS/AMSU/HSB Project Overview



| | |
|---|---|
| **Spacecraft:** | **EOS Aqua** |
| **Instruments:** | **AIRS, AMSU, HSB, MODIS, CERES, AMSR-E** |
| **Launch Date:** | **May 4, 2002** |
| **Launch Vehicle:** | **Boeing Delta II Intermediate ELV** |
| **Mission Life:** | **5 years** |
| **Team Leader:** | **Moustafa Chahine (JPL)** |

**AIRS Project Objectives**

1. **Improve Weather Forecasting: AIRS data assimilated operationally by major NWP centers**
2. **Support Climate Modeling: AIRS Water Vapor Profiles**
3. **Understanding Tropospheric Chemistry: $O_3$, CO, $CO_2$, $CH_4$ + Others**

National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS Project Major Milestones

| | | |
|---|---|---|
| L+0 | May 2002 | AIRS Launched |
| L+5 m | Oct 2002 | AIRS operational |
| L+6 m | Nov 2002 | L1B Released to Public |
| L+16 m | Sep 2003 | L2 Released to the Public |
| L+16 m | Sep 2003 | L2 Products Validated over Oceans |
| L+17 m | Oct 2003 | First NWP Center Assimilation |
| L+17 m | Oct 2003 | Forecast Impact SH (Atlas) |
| L+29 m | Oct 2004 | Forecast Impact NH (LeMarshall) |

Coming in 2005…

- Level 3 Released to Public
- Retrievals Working over Land Released to Public
- AIRS Used for Atmospheric Composition

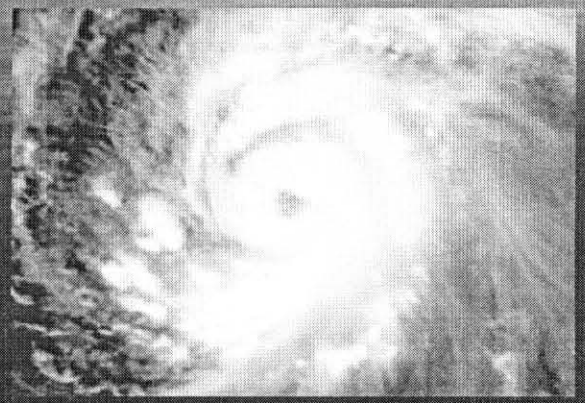
National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

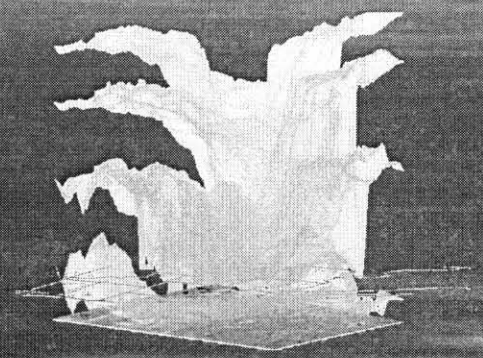
# AIRS Supports Weather Forecasting

## Improved Temperature Profiles

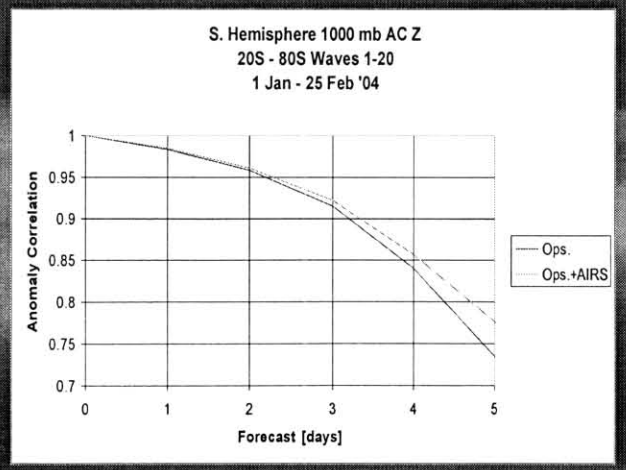
## Super Typhoon Pongsona Isotherms



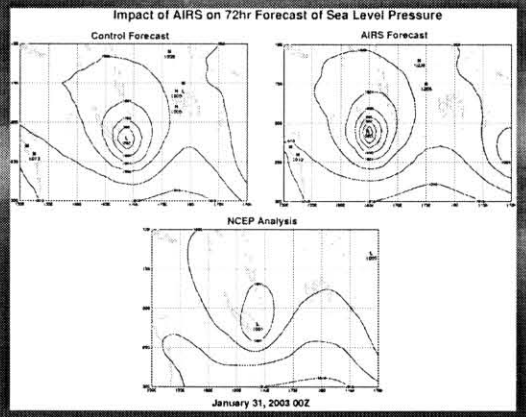
## Improved Water Vapor Profiles



## Forecast Impact

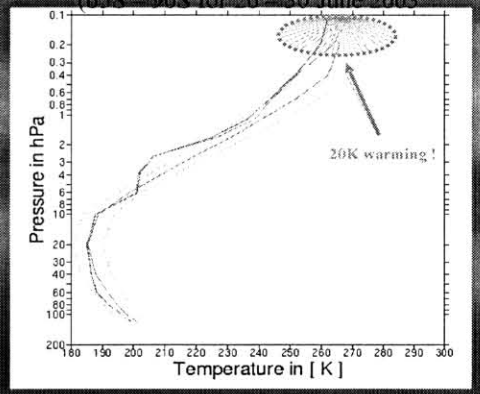



## Improved Position and Magnitude Forecast of Cyclones




## Model Improvement

26R3 – WITH AIRS radiances
(65S – 90S for 20 – 30 June 2003

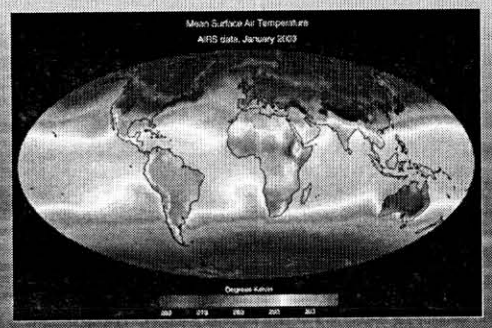


National Aeronautics and
Space Administration

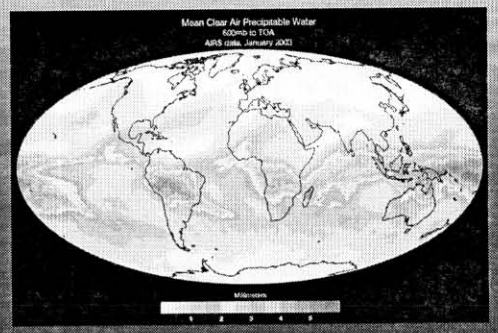
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS Supports Climate Science

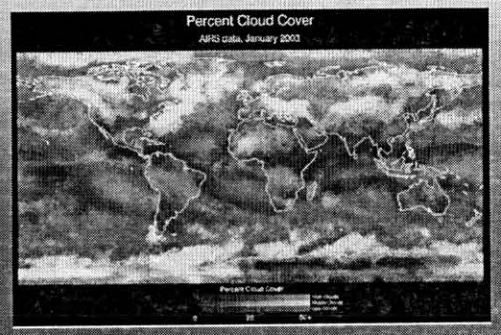
## Monthly Temperature




## Monthly Upper Atm. H2O

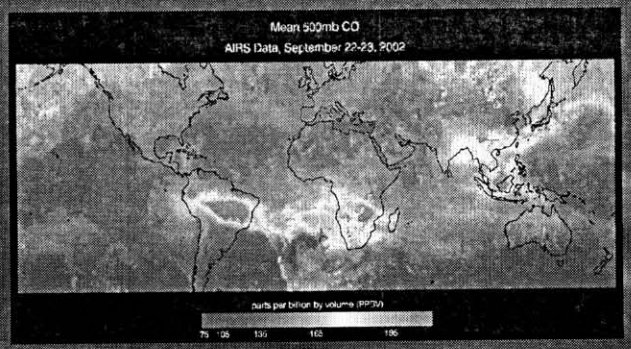



## Clouds

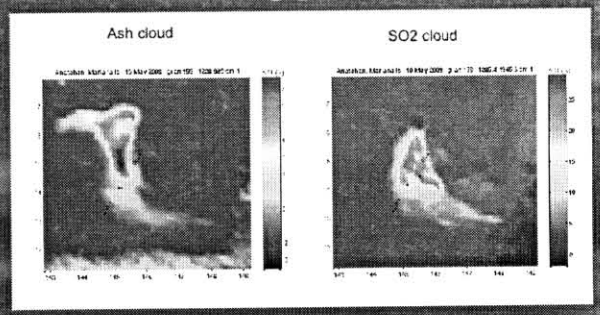



## Ozone

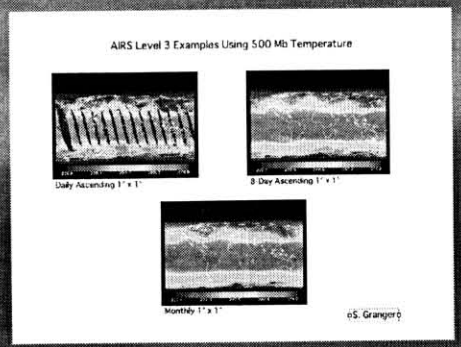
## CO



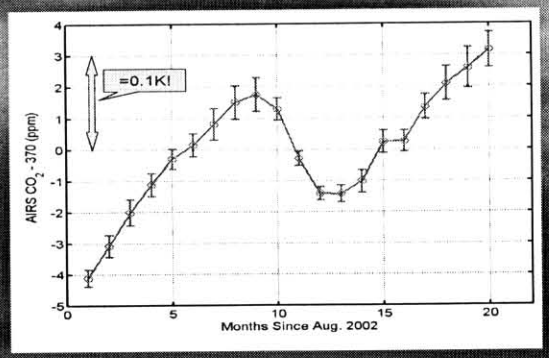

## SO2



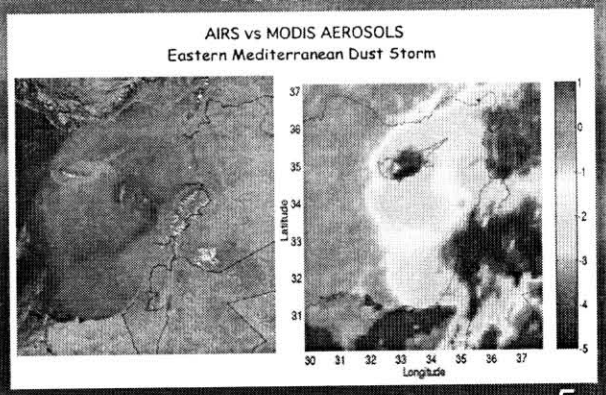

## Level 3 Products




## CO2




## Aerosols



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS User Services

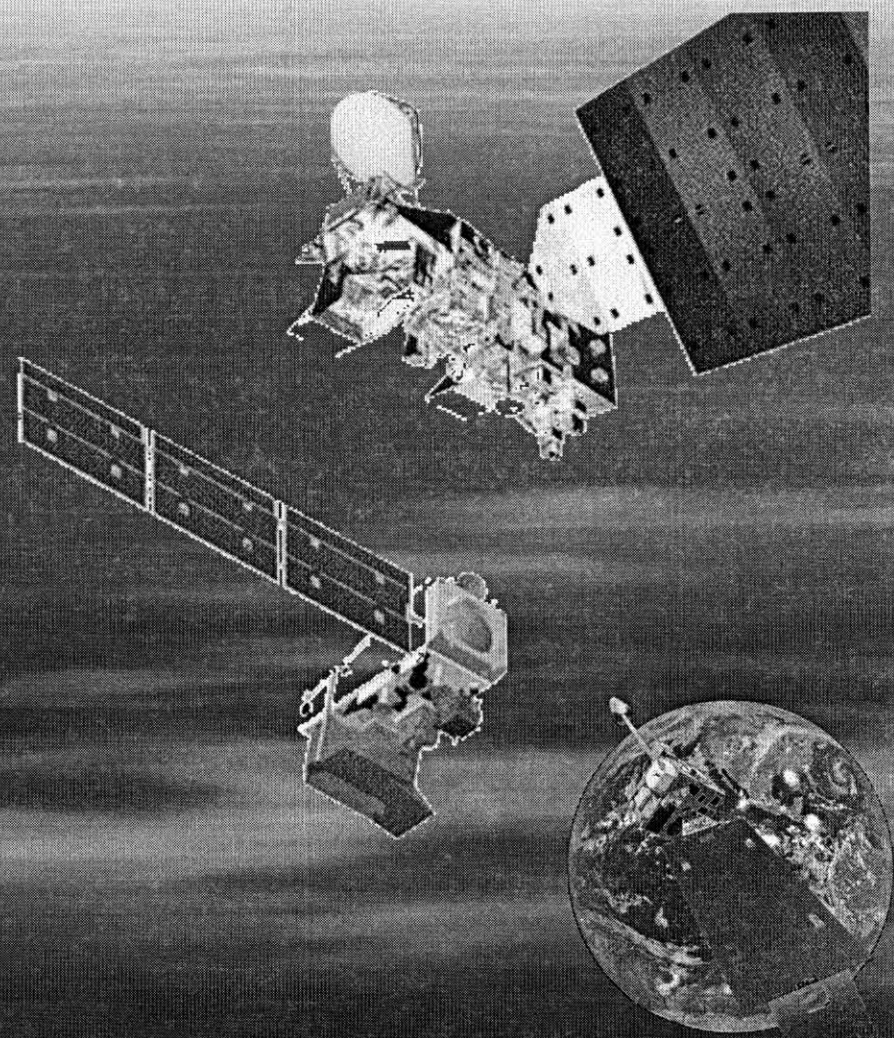
- Community Data Requests
  - Folks who ask for special types/formats of data:
  - Wallace McMillan, UMBC
  - Roger Heymann, NOAA/NESDIS
  - Kurt Lightner, UMBC
  - GODAE high-resolution sea surface temperature (GHRRST)
  - Bob Atlas, GLA
  - Vinson/Revercomb, UW
  - Elena Lobl, AMSR MSFC
  - Sam Benedict, GEWEX
  - Matt Thomas, UCSB
  - Duane Waliser, NCAR
  - GDAAC
- Information Requests
  - 49 Questions Received and Answered on the AIRS Inquiry Web Page:
  - University of Johannesburg, South Africa, Boston university, Florida State University, University of Alabama, Huntsville, George Institute of Technology. University of California, Los Angeles, George Mason University, California Institute of Technology, University of Wisconsin, Madison, Imperial College, London, Atmospheric and Environmental Research, Inc, Larcon Construction, FL,Boeing, Korea Remote Sensing Satellite Ground Station, Daejun, Nacional de Pequisas Espaciais (INPE), Brazil

National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

# AIRS Paving the Way for Future Sounders

- Current IR Sounder
  - Aqua AIRS
    - 2002 Launch
    - LEO
    - 3.7-15.4 μm
    - 13.5 km IFOV
- Planned IR Sounders
  - NPOESS CrIS
    - 2006 Launch
    - LEO
    - 3.9-15.4 μm
    - 14 km Resolution
  - GOES-R HES
    - 2012 Launch
    - GEO
    - 4.4 – 15.4 μm
    - 4 km Resolution



# Summary and Conclusions

- AIRS Experiment very Successful
  - Technology Demonstration a Success
  - Retrieval Demonstration a Success
  - Weather Forecasters Showing Impact
  - IR Spectrum a "Fundamental CDR"
- What lies ahead…
  - Land Surface Spectral Emissivity
  - Retrieval of Trace Gases and Aerosols
  - Further improvement in weather forecasting