NPOESS Preparatory Project (NPP)
Science Overview

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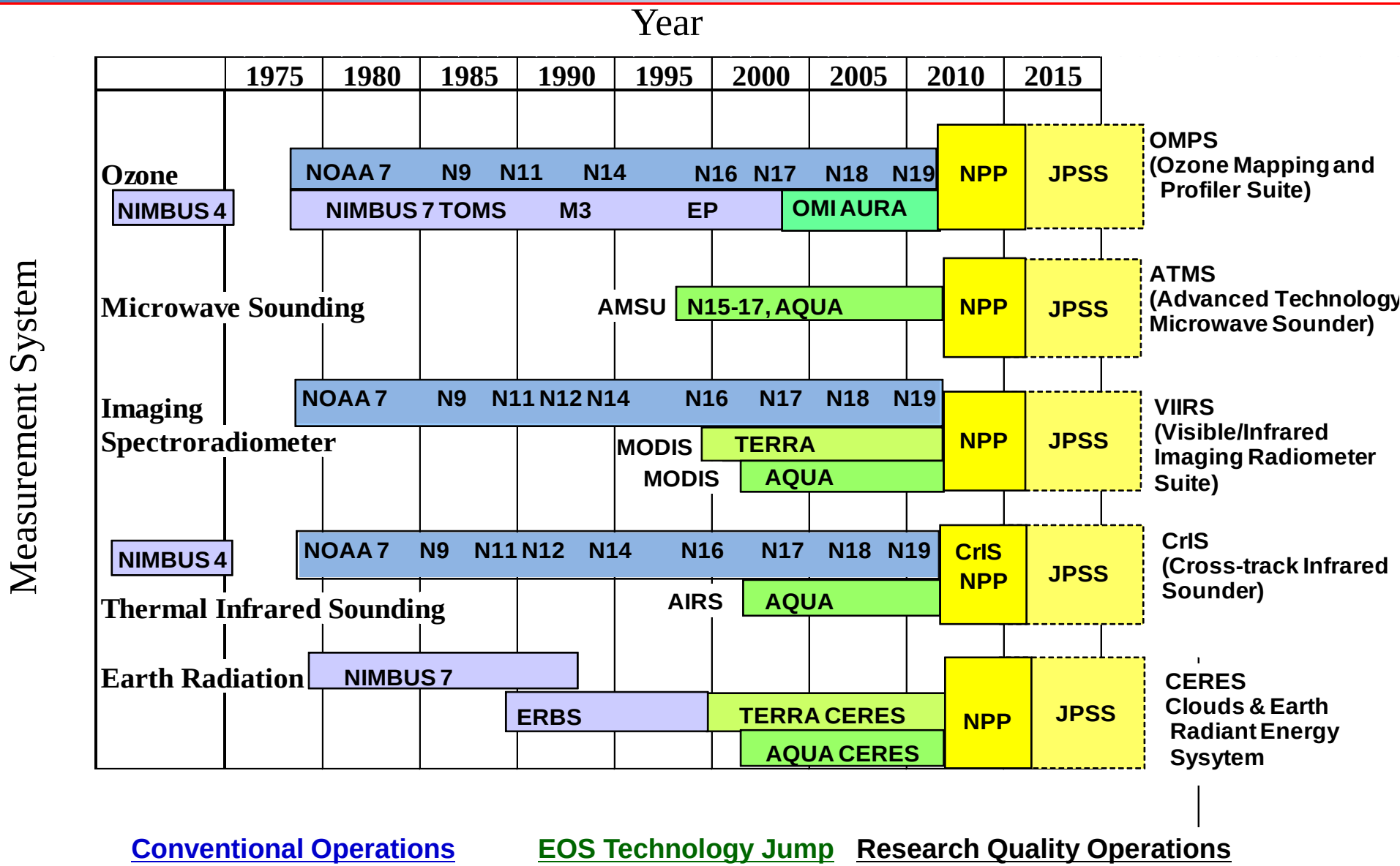
NASA GSFC

AIAA Space 2011 Conference
Long Beach, CA

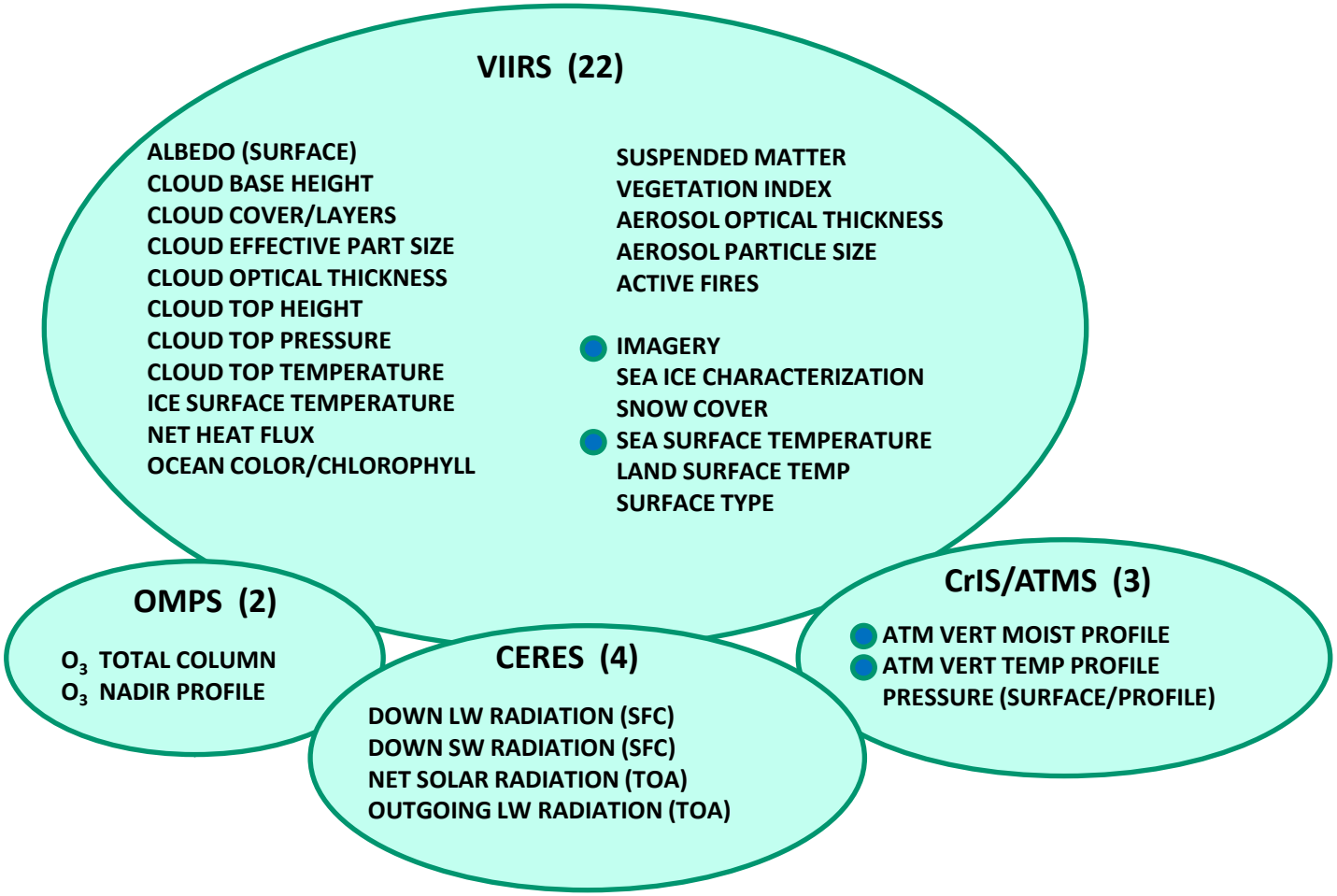
23 - 24 August 2011

NPP Continues Important Operational and Research Remote Sensing Data Time Series



Conventional Operations EOS Technology Jump Research Quality Operations

NPP Sensor Data Records (SDRs) Produce Environmental Data Records (EDRs)



● Denotes Key Performance Parameter (KPP)

NPP Mission Goals

Provide Data for Weather Forecast Models

Short term Environmental Observations (Events)

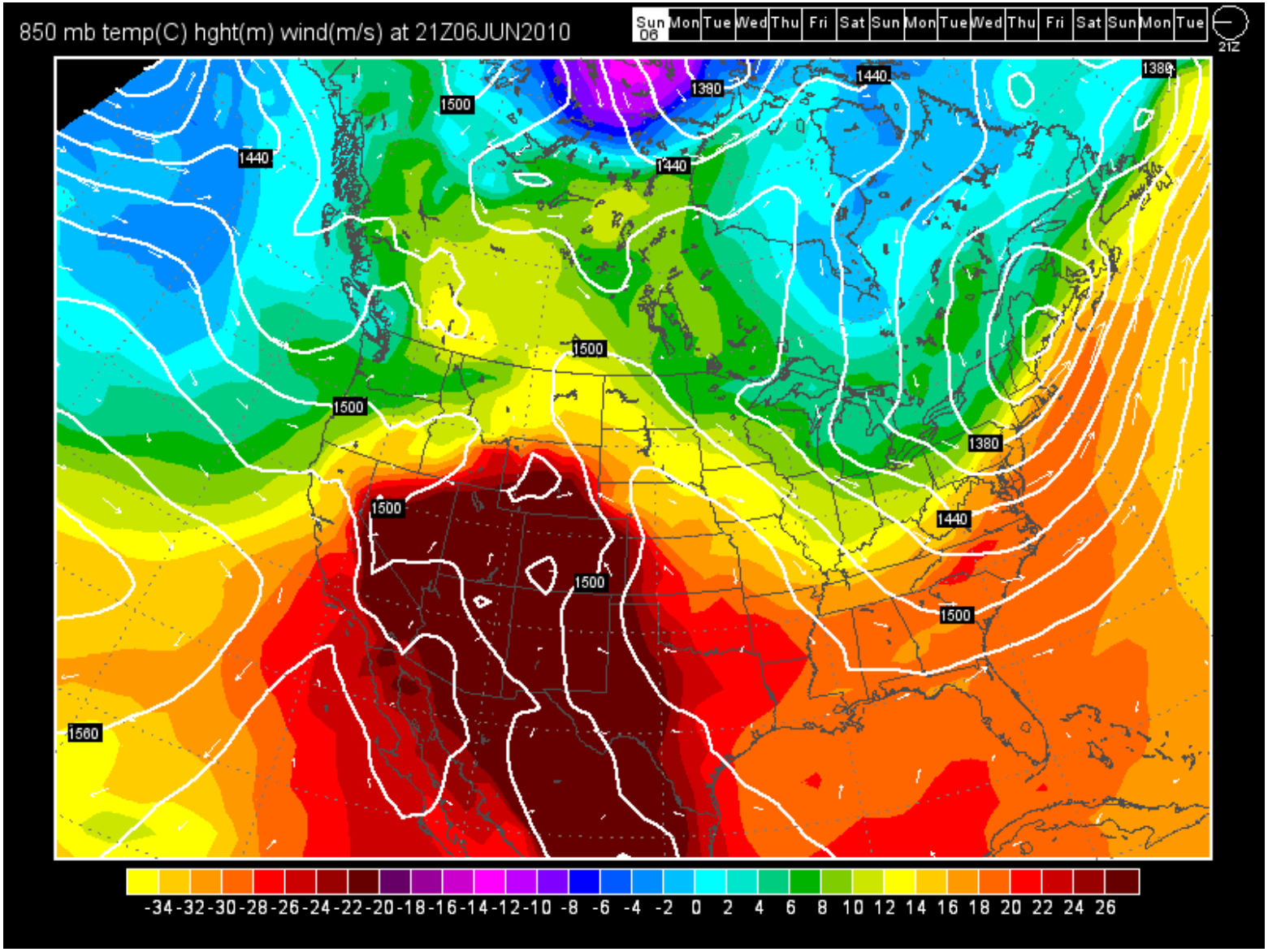
Long term Environmental Observations (Climate Change Detection)

Provide Data for Weather Forecast Models

Short term Environmental Observations
(Events)

Long term Environmental Observations
(Climate Change Detection)

Weather Model



ATMS & CrIS: Temperature & Water Vapor Profiles (1 of 2)

Advanced Technology Microwave Sounder (ATMS)

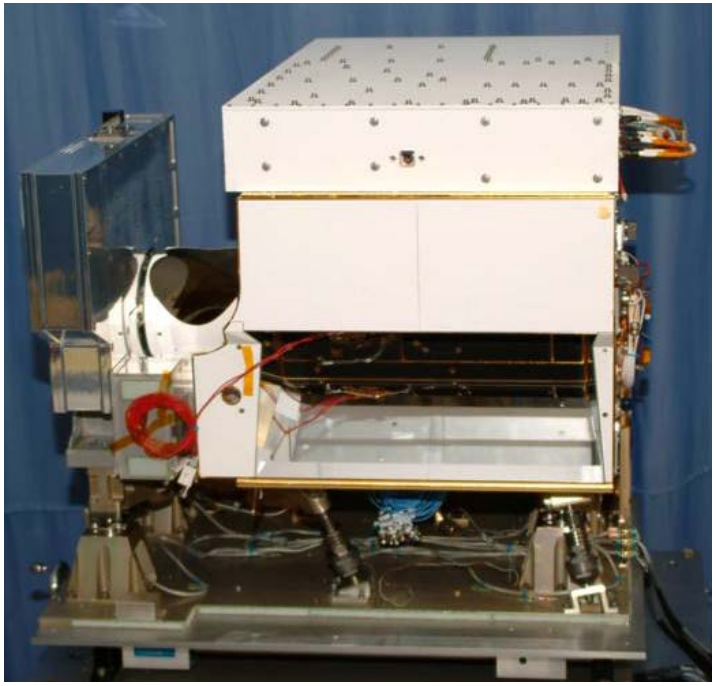
- Scanning passive microwave radiometer
- Heritage instruments:
  - Advanced Microwave Sounding Unit (AMSU)-A1
    - NOAA-15, 16, 17, 18, & 19
    - NASA Aqua
    - EUMETSAT MetOp-A
  - AMSU-A2
    - NOAA-15, 16, 17, 18, & 19
    - EUMETSAT MetOp-A
  - Microwave Humidity Sounder (MHS)
    - NOAA-18 & 19
  - Humidity Sounder for Brazil (HSB)
    - NASA Aqua
  - AMSU-B
    - NOAA-15, 16, 17
  - Microwave Sounding Unit (MSU) & Stratospheric Sounding Unit (SSU)
    - Pre-NOAA-15

ATMS & CrIS: Temperature & Water Vapor Profiles (2 of 2)

Crosstrack Infrared Sounder (CrIS)

- **3-Band Michelson Interferometer**
- **Heritage instruments:**
  - **Advanced Infrared Sounder (AIRS)**
    - **NASA Aqua**
  - **Infrared Atmospheric Sounding Interferometer (IASI)**
    - **EUMETSAT MetOP-A**

ATMS and CrIS instrument radiances (SDRs) and temperature and moisture profiles are the primary data products required for National Weather Service forecast models.



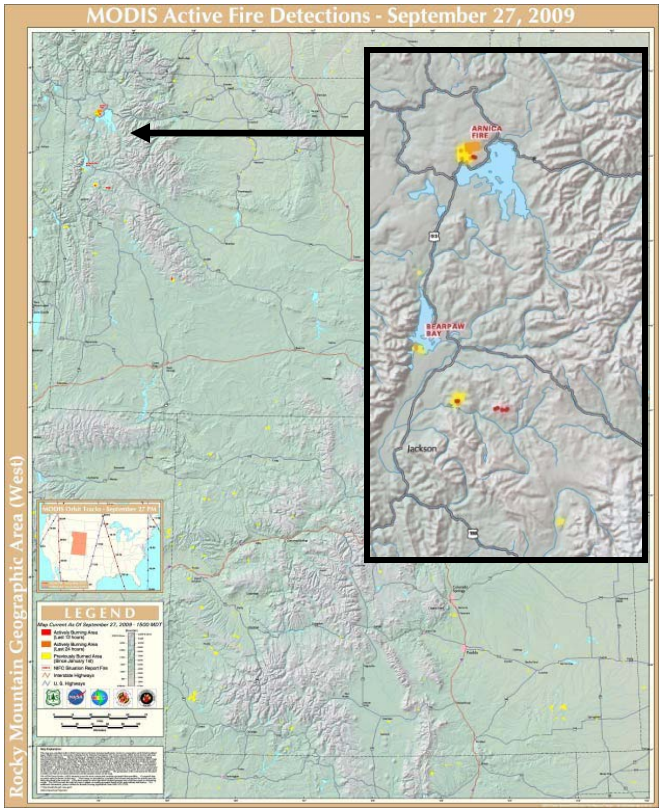
NPP Mission

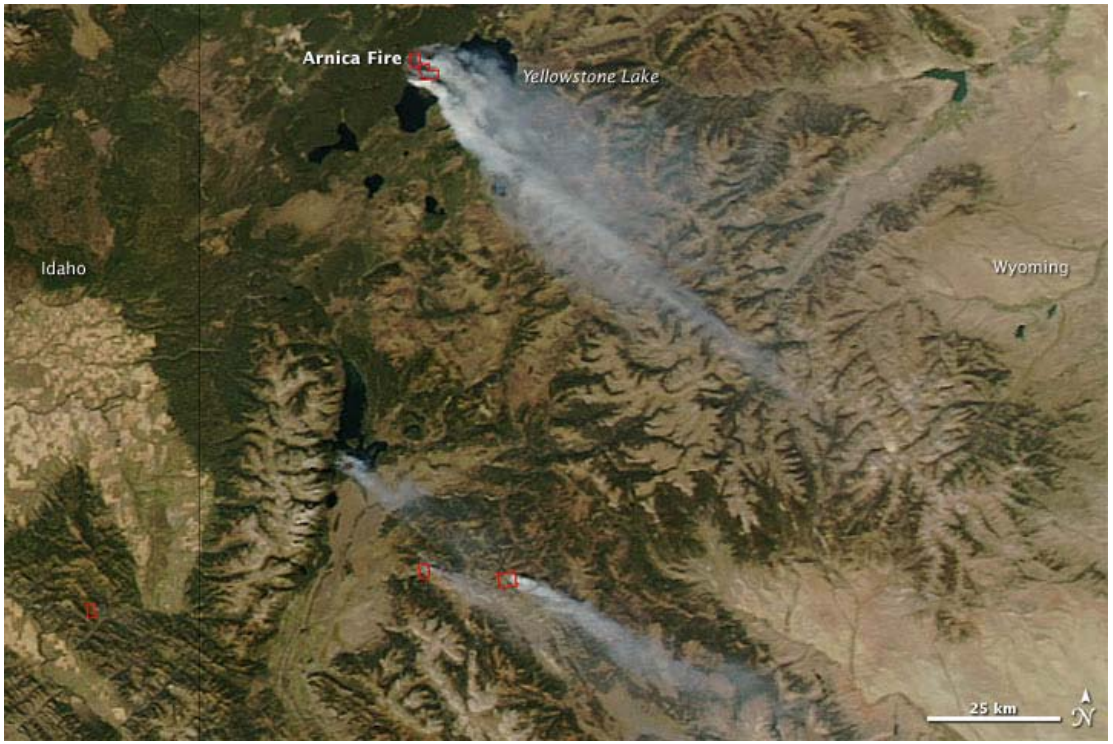
Provide Data for Weather Forecast Models

Short term Environmental Observations (Events)

Long term Environmental Observations (Climate Change Detection)

Forest Fire Management USDA Forest Service
MODIS Active Fire Mapping Program





Yellowstone Fire September 27, 2009

The MODIS Active Fire Mapping Program provides a near real-time geospatial overview of the current wildland fire situation at regional and national scales. Locations of current fires and the extent of previous fire activity are ascertained using satellite imagery acquired by the MODIS sensor.. This information is utilized by fire managers to assess the current fire situation and serves as a decision support tool in strategic decisions regarding fire suppression resource allocation.

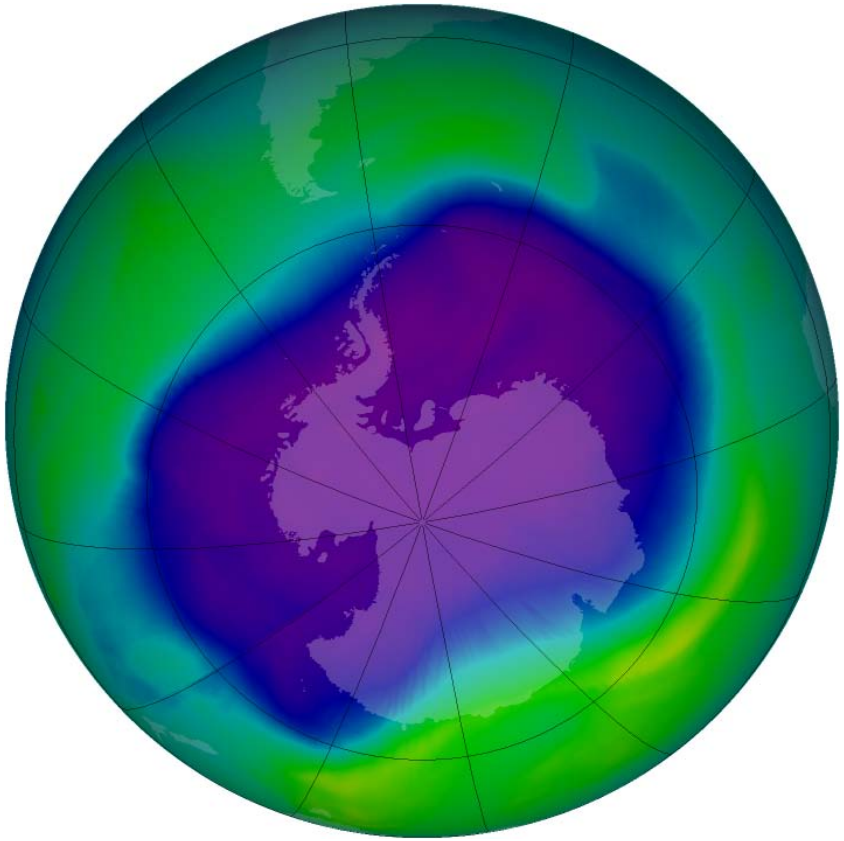
http://activefiremaps.fs.fed.us/index.php

VIIRS: Global Observations of Land, Ocean, and Atmosphere at High Temporal Resolution

Visible/Infrared Imager Radiometer Suite

- **Multi-spectral, moderate resolution scanning radiometer (22 bands between 0.4 µm and 12 µm with 12-bit quantization)**
- **Heritage Instruments:**
  - **MODerate resolution Imaging Spectroradiometer (MODIS)**
    - **NASA Terra & Aqua**
  - **Sea-viewing Wide Field-of-view Sensor (SeaWiFS)**
    - **NASA Orbview-2**
  - **Advanced Very High Resolution Radiometer/3 (AVHRR/3)**
    - **NOAA 15, 17, (AM orbit), 16, 18, & 19 (PM orbit)**
    - **MetOp-A (AM orbit)**
  - **Operational Linescan System (OLS)**
    - **DMSP 5D-1, 5D-2, & 5D-3**

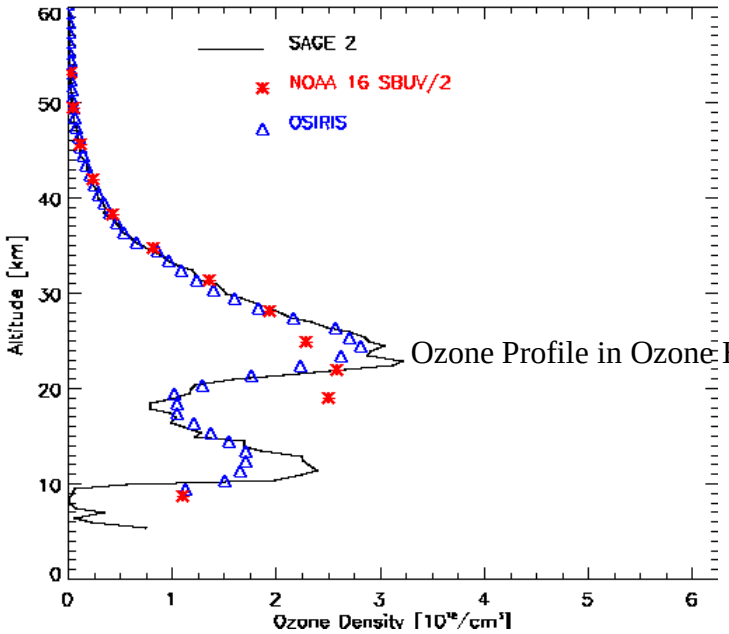
Ozone Hole: September 24, 2006



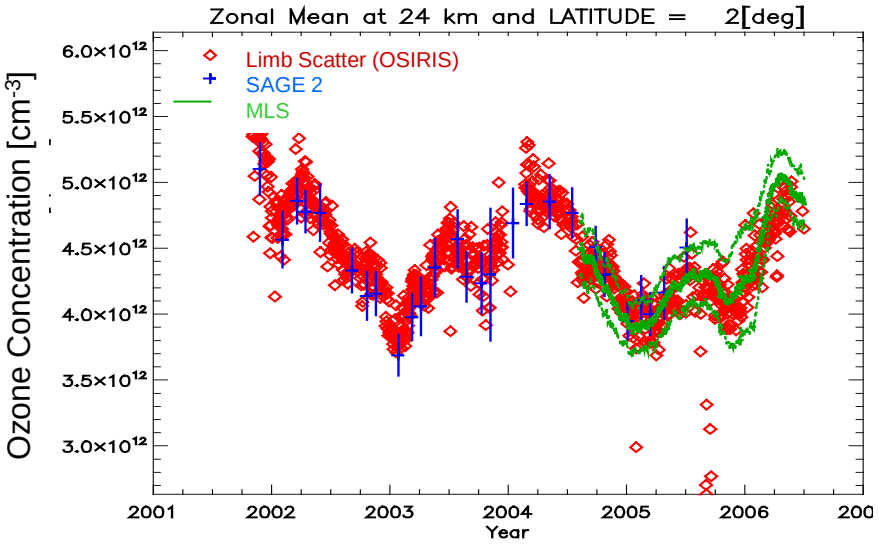
Largest Ozone Hole
30 million km^2

Area of North America
25 million km^2

Ozone Profile Comparison 10/10/2002



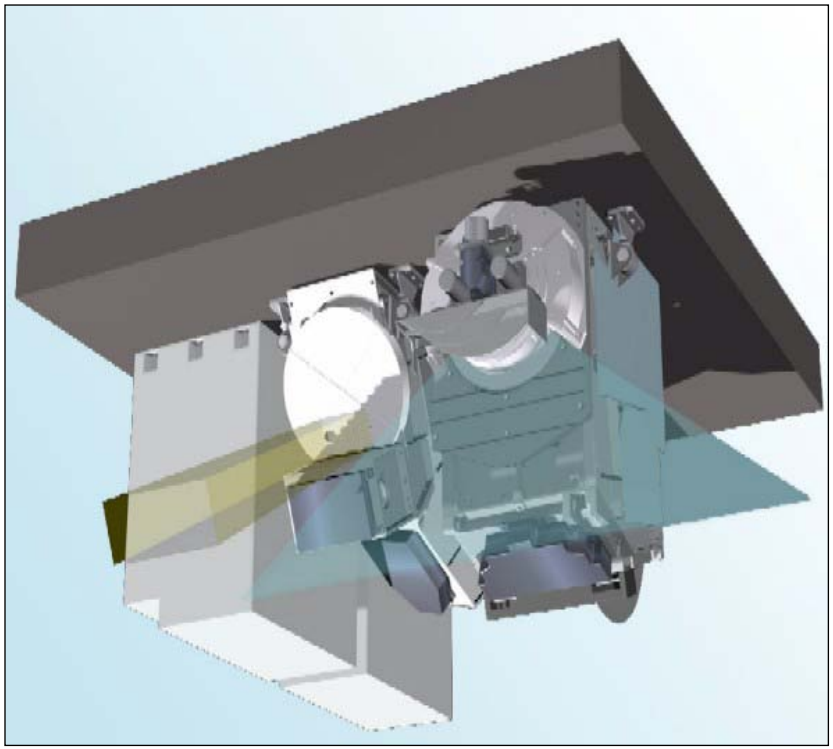
Ozone Profile in Ozone Hole



OMPS: Monitoring Total Column and Vertical Profile of Ozone

Ozone Mapping and Profiler Suite

- Nadir and limb push broom CCD spectrometers
- Heritage Instruments:
  - Total Ozone Mapping Spectrometer (TOMS)
    - NASA Earth Probe
    - Japan ADEOS
    - Russia Meteor-3
    - Nimbus-7
  - Solar Backscatter UltraViolet instrument (SBUV)
    - NOAA 9, 11, 16, 17, 18 & 19
  - Ozone Monitoring Instrument (OMI)
    - NASA Aura
  - Global Ozone Monitoring Experiment (GOME)
    - ESA ERS-2
  - Optical Spectrograph and InfraRed Imaging System (OSIRIS)
    - Sweeden Odin
  - Scanning Imaging Absorption SpectroMeter for Atmospheric CartograpHY (SCIAMACHY)
    - ESA ENVISAT



NPP Mission

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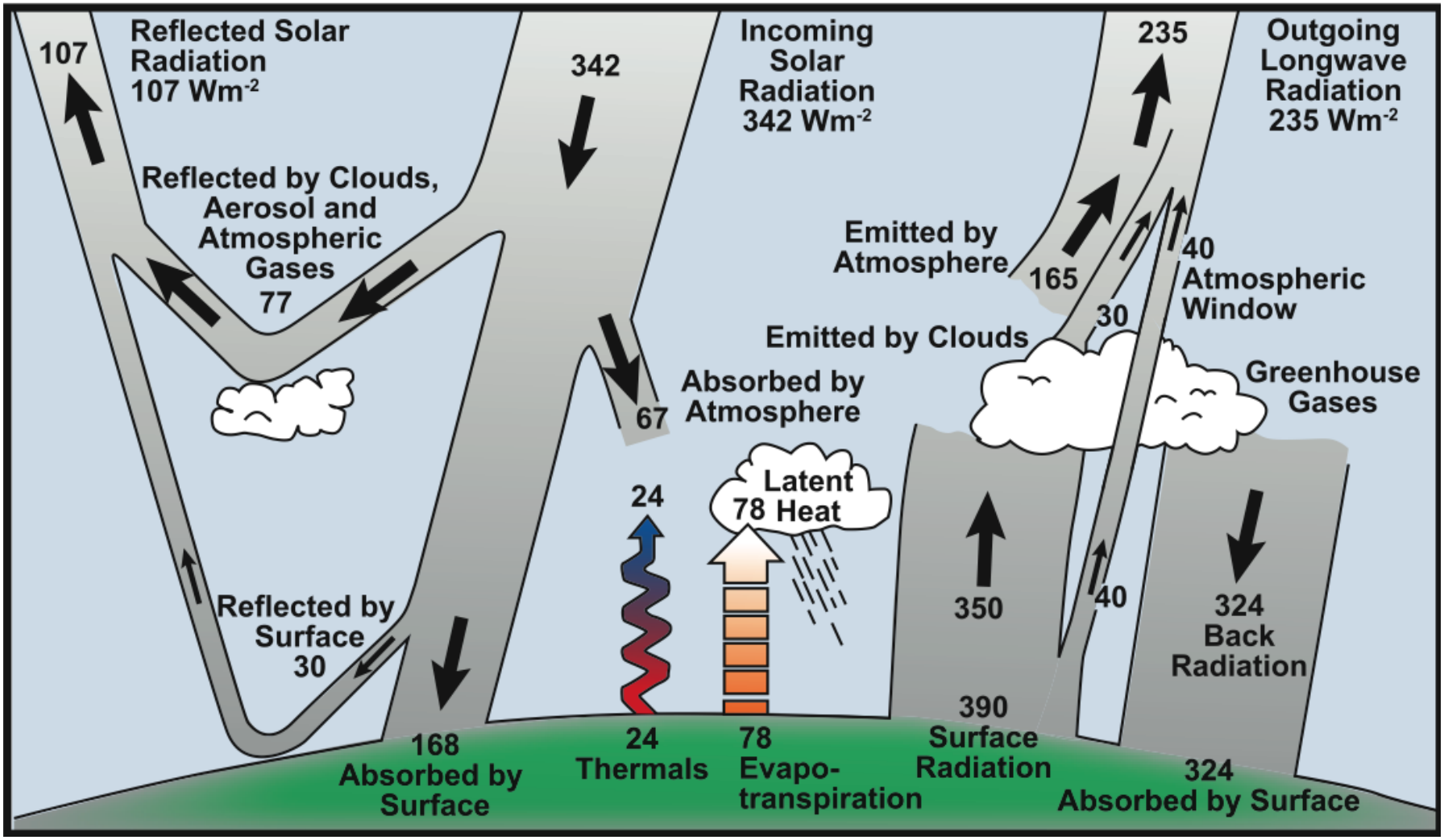
Earth Radiation Budget

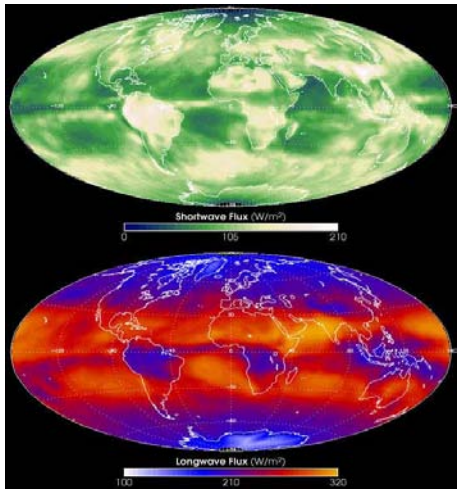
CERES Shortwave | TSIS | CERES Longwave



CERES: Measuring the Earth's Energy Budget

Clouds and the Earth's Radiant Energy System

- **Scanning radiometer measuring TOA total, shortwave, and longwave radiation**
- **Heritage instruments**
  - **CERES**
    - **NASA TRMM**
    - **NASA Terra (2)**
    - **NASA Aqua (2)**

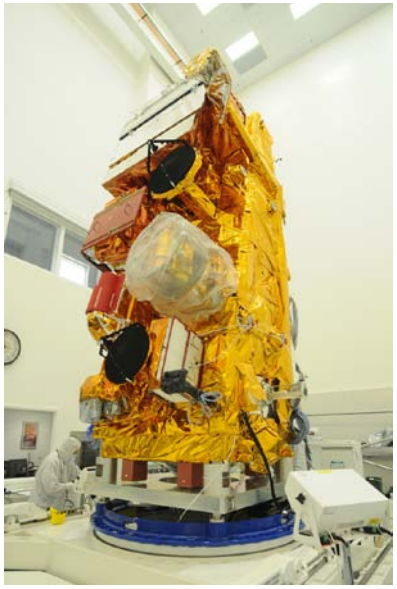


CERES Shortwave

CERES Longwave

Summary

- **NPP Instruments**
  - **Well understood thanks to instrument comprehensive test, characterization and calibration programs.**
  - **Gov't team ready for October 25 launch followed by instrument activation and Intensive Calibration/Validation (ICV).**
- **NPP Data Products**
  - **JPSS Center for Satellite Applications and Research (STAR) team ready to support NPP ICV and operational data products.**
  - **NASA NPP science team ready to support NPP ICV and EOS data continuity.**



Spacecraft/Instrument/Ground Station Presentations

- NPP Spacecraft: Scott Asbury, Ball Aerospace and Technologies Corporation
- ATMS: Luvida Asai, Northrop Grumman Electronic Systems
- CERES: Mark Folkman, Northrop Grumman Aerospace Systems
- CrIS: Ron Glumb, ITT Geospatial Systems
- OMPS: Bill Roettker, Ball Aerospace and Technologies Corporation
- VIIRS: Greg Roth, Raytheon
- Common Ground System: Bill Sullivan

- Discussion and Questions