

# NOAA's Climate Data Record Project- Update of Status and Plans

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NOAA's National Climatic Data Center



# Outline

- NOAA's Climate Service new Line Office
- NOAA's Climate Data Record Project
- Transitioning NASA climate sensors to NOAA
- How you can participate

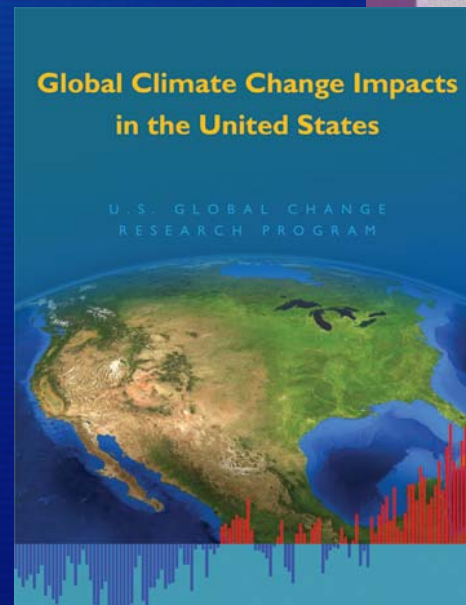


# NOAA Climate Service - Some background....

## ASSESSMENTS

NOAA support for assessments over recent years includes:

- 9 GCRP Synthesis and Assessment Products
- GCRP Global Climate Change Impacts Report
- IPCC assessments
- All ozone assessments
- State of the Climate Reports



# NOAA is creating a new Climate Service Capability and Line Office

NOAA Headquarters and Staff Offices

Under Secretary of Commerce for Oceans and  
Atmosphere and Administrator

National  
Marine  
Fisheries  
Service

Assistant  
Administrator

National  
Ocean  
Service

Assistant  
Administrator

National  
Weather  
Service

Assistant  
Administrator

National  
Environmental  
Satellite, Data  
and Information  
Service

Assistant  
Administrator

NOAA Climate  
Service

Assistant  
Administrator

Office of  
Oceanic and  
Atmospheric  
Research

Assistant  
Administrator



# Proposed NOAA Climate Service

## NESDIS DATA CENTERS

National Climatic  
Data Center

National Oceanographic  
Data Center

National Geophysical  
Data Center

## OAR PROGRAM & LABORATORIES

Earth System Research Lab  
Office of the Director  
Chemical Sciences Division  
Global Monitoring Division  
Physical Sciences Division

Geophysical Fluid Dynamics  
Laboratory

Climate Program Office

## NWS FUNDING TO MANAGE NETWORKS (NO STAFF CHANGE)

Climate Observing Network  
Tropical Atmosphere Ocean  
(TAO)  
Historical Climate Network  
(HCN)  
Hourly Precipitation Gauge  
Modernization

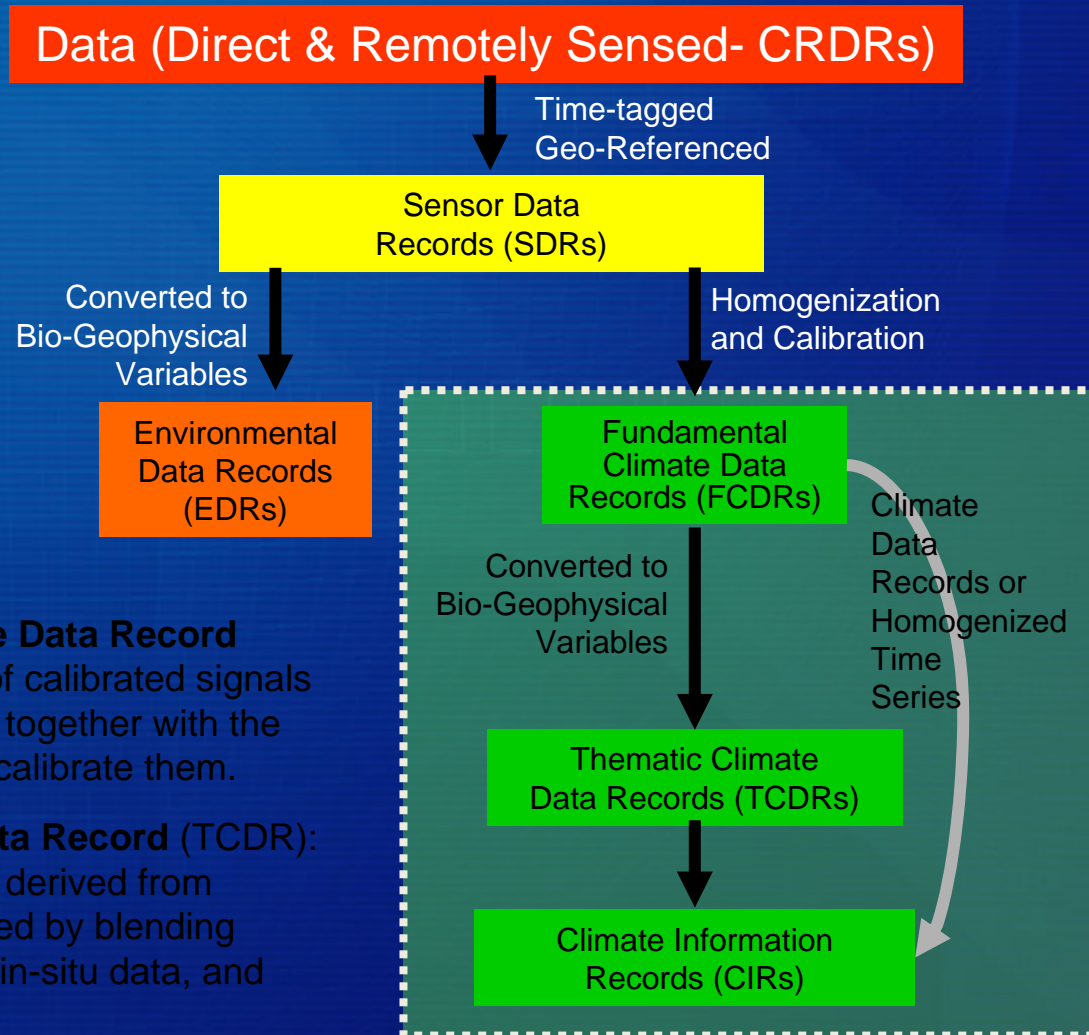
*The physical location of these facilities will not change*





# CDR Information Flow

## Climate Data Records



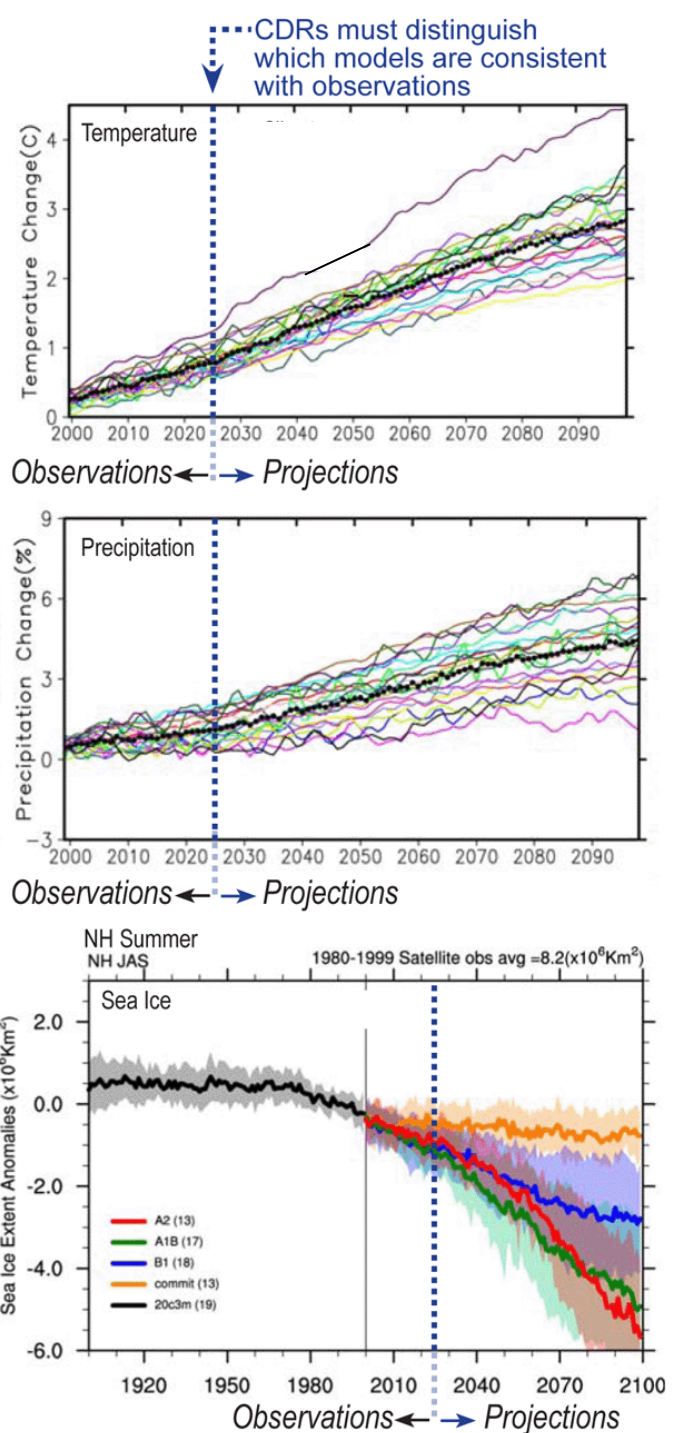
**Fundamental Climate Data Record (FCDR):** Time series of calibrated signals for a family of sensors together with the ancillary data used to calibrate them.

**Thematic Climate Data Record (TCDR):** Geophysical variables derived from FCDRs, often generated by blending satellite observations, in-situ data, and model output.

# What Climate Trajectory Are We On?

- IPCC model projections for most parameters vary greatly
- Mitigation and adaptation strategies depend on identifying which models are best
- High quality, sustained CDRs are needed to initiate and validate climate model projections

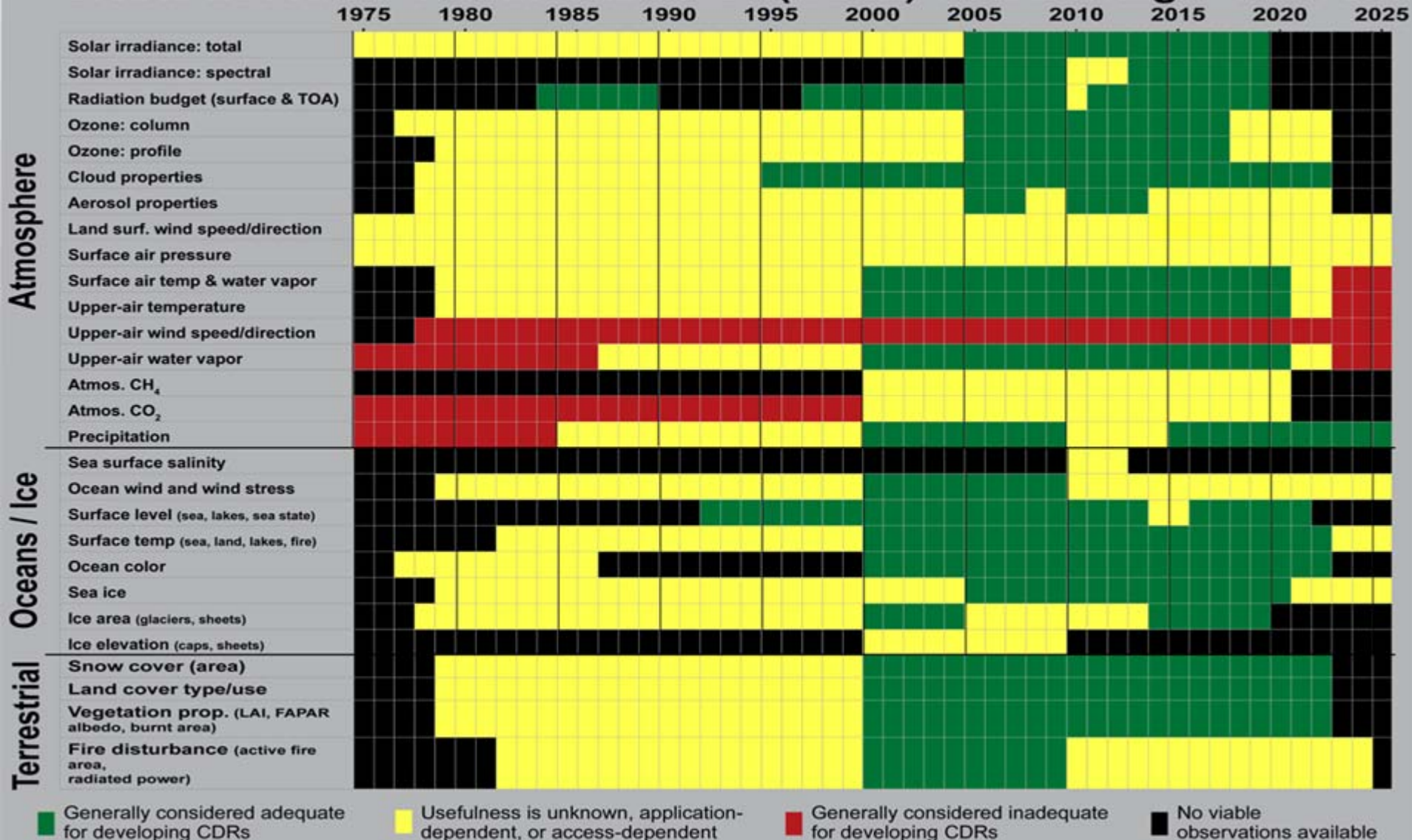
Other uses of CDRs: Detecting, understanding, predicting, and projecting climate change also require long-term records





# Combining Multi-Satellite Data Can Unlock Further Climate Information

## Global Essential Climate Variables (ECVs) with Heritage Records





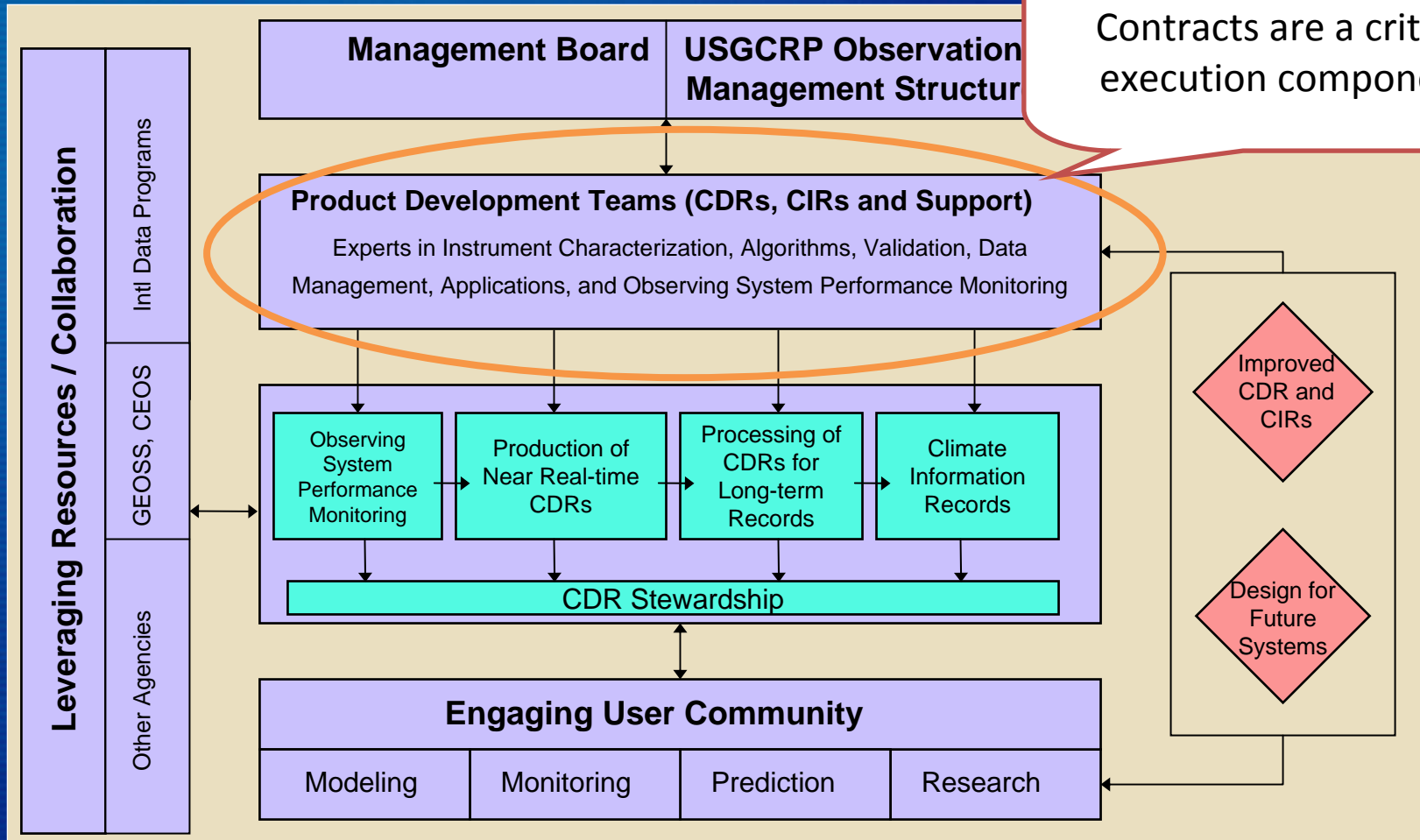
# Maturity Matrix Identifies Milestones and Research-to-Operations Transition Points

Daily Optimum Interpolation Sea Surface Temperature

■ : Completed  
 ■ : In Process

Maturity	Sensor Use	Algorithm Stability	Metadata & QA	Documentation	Validation	Public Release	Science & Applications
1	Research Mission	Significant changes likely	Incomplete	Draft ATBD	Minimal	Limited data availability to develop familiarity	Little or none
2	Research Mission	Some changes expected	Research grade (extensive)	ATBD Version 1	Uncertainty estimated for select locations/times	Data available but of unknown accuracy; caveats required for use.	Limited or ongoing
3	Research Missions	Minimal changes expected	Research grade (extensive); Meets international standards	Public ATBD; Peer-reviewed algorithm and product descriptions	Uncertainty estimated over widely distribute times/location by multiple investigators; Differences understood.	Data available but of unknown accuracy; caveats required for use.	Provisionally used in applications and assessments demonstrating positive value.
4	Operational Mission	Minimal changes expected	Stable, Allows provenance tracking and reproducibility; Meets international standards	Public ATBD; Draft Operational Algorithm Description (OAD); Peer-reviewed algorithm and product descriptions	Uncertainty estimated over widely distribute times/location by multiple investigators; Differences understood.	Data available but of unknown accuracy; caveats required for use.	Provisionally used in applications and assessments demonstrating positive value.
5	All relevant research and operational missions; unified and coherent record demonstrated across different sensors	Stable and reproducible	Stable, Allows provenance tracking and reproducibility; Meeting international standards	Public ATBD, Operational Algorithm Description (OAD) and Validation Plan; Peer-reviewed algorithm, product and validation articles	Consistent uncertainties estimated over most environmental conditions by multiple investigators	Multi-mission record is publicly available with associated uncertainty estimate	Used in various published applications and assessments by different investigators
6	All relevant research and operational missions; unified and coherent record over complete series; record is considered scientifically irrefutable following extensive scrutiny	Stable and reproducible; homogeneous and published error budget	Stable, Allows provenance tracking and reproducibility; Meeting international standards	Product, algorithm, validation, processing and metadata described in peer-reviewed literature	Observation strategy designed to reveal systematic errors through independent cross-checks, open inspection, and continuous interrogation	Multi-mission record is publicly available from Long-Term archive	Used in various published applications and assessments by different investigators

# CDR Project Functional Framework



# NOAA Climate Sensors Background (1 of 3)

- From January to June 2006, the NPOESS program underwent a Nunn-McCurdy Certification process that resulted in the program being restructured over the next two years
  - The Nunn-McCurdy Congressional certification process was a Tri-Agency process
  - The resulting Acquisition Decision Memorandum (ADM) of the Department of Defense (DoD) outlined the nature of the restructured Program
    - De-manifested Earth Radiation Budget Sensor (ERBS), TSIS, Altimeter, Space Environment Sensor Suite (SESS), Aerosol Polarimeter Sensor (APS) and Survivability sensor (SUS)
    - Directed NPOESS fly with Space Environment Monitor and CERES sensors instead of ERBS and SESS
    - De-manifested the OMPS Limb sensor from both the NPOESS Preparatory Project (NPP) and NPOESS 1330 satellite



# NOAA Climate Sensors Background (2 of 3)

- In January 2007, NOAA and NASA drafted a white paper called *“Impacts of NPOESS Nunn-McCurdy Certification on joint NASA-NOAA Climate Goals”*
  - Described impacts of the NPOESS Nunn-McCurdy Certification on the climate program goals of NASA and NOAA
  - Provided recommended approaches for recovering the impacted climate observations and related science
- In April 2007, NASA and NOAA announced a plan to restore OMPS-Limb to NPP
- In January 2008, NASA and NOAA selected the CERES Flight Model (FM) 5 sensor for flight on NPP
- In May 2008, the NPOESS tri-agency Executive Committee agreed to restore the Total Solar Irradiance Sensor (TSIS) to NPOESS C1
- A 2008 National Research Council (NRC) Report: *“Ensuring the Climate Record from the NPOESS and GOES-R Spacecraft”*, recommended sustaining the following sensors considered relevant to Climate Science:
  - Altimeter; CERES / ERBS; TSIS; APS; OMPS-Limb

# NOAA Climate sensors Background (3 of 3)

- In February 2010, the President's FY 2011 budget request for NOAA directed the NPOESS program to split into separate NOAA/NASA and DoD programs
  - NOAA/NASA Joint Polar Satellite System (JPSS) covers the afternoon (1330) orbit
  - JPSS flies an "NPP-like" satellite bus
  - DoD covers the early morning (0530) orbit
  - NOAA manages the JPSS ground system





# How you can participate

- NPP Climate Raw Data Record (CRDR)
  - NPP/JPSS formats are very difficult
  - CRDR will reformat to easy NetCDF CF for easy use in reprocessing
  - Join us by evaluating beta software
- We have jobs, Jobs, JOBS
  - 5 federal jobs – U.S. Citizens only
  - New Cooperative Institute for Climate and Satellites (CICS-NC) - 15 jobs – post-docs, scientists, visiting scientists
- We are funding Grants
  - June Announcement - \$2.5M in new starts
  - \$5M/yr ongoing grants

**Thank you.**

**Questions**



International TOVS Study Conference, 17<sup>th</sup>, ITSC-17, Monterey, CA, 14-20 April 2010.  
Madison, WI, University of Wisconsin-Madison, Space Science and Engineering Center,  
Cooperative Institute for Meteorological Satellite Studies, 2011.