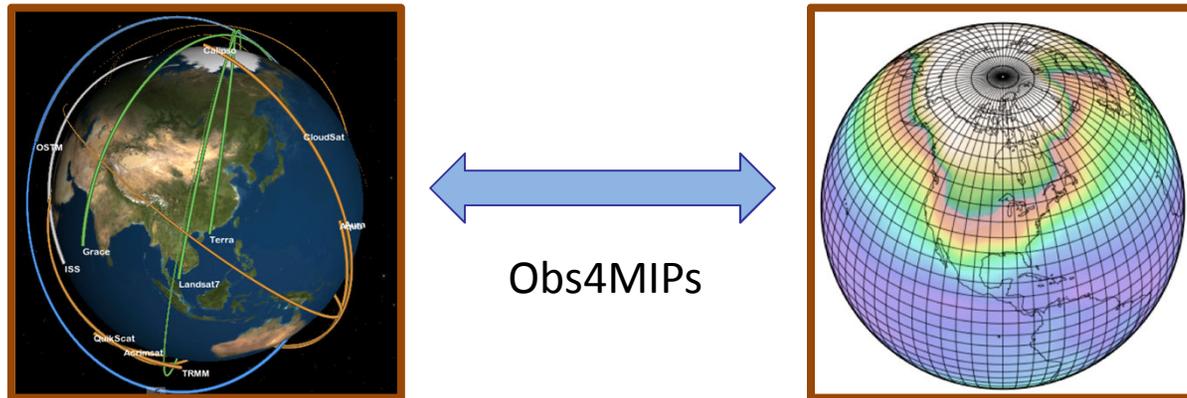




obs4MIPs: An Overview and Update



Obs4MIPs is a pilot effort to improve the connection between data experts and scientists involved in climate model evaluation. It is closely aligned with CMIP5, with encouragement from the WGCM and WGNE. NASA and the U.S. DOE have initiated the project with significant contributions of appropriate NASA products. An overarching goal is to enable other data communities to contribute data to Obs4MIPs.

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Aug 1, 2012



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NASA HQ

AIRS, AMSR-E, CERES, MLS, MODIS, OSTM, OVW, TRMM, (PO)DAAC, others...

MANY OTHERS

NASA obs4MIPs Science Working Group

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C. Peters-Lidard/GSFC, N. Loeb/LaRC, R. Nemani/ARC, S. Platnick/GSFC,
P. Gleckler (PCMDI), J. Bates (NOAA)

Program Executive: T. Lee/HQ, **Project Manager:** Robert Ferraro/JPL



Observations for CMIP5 Simulations

History/Timeline

Mid 2007-Mid 2009: JPL discussions on how to improve satellite usage in CMIPx/IPCC ARx.

July 2009: JPL/PCMDI IT for Climate Research Workshop held in Pasadena to discuss technical challenges and progress of sharing observations.

September 2009: Briefing to WGCM on plans to make satellite observations more accessible for CMIP5/AR5; received WGCM support and encouragement.

March 2010: Briefings to WOAP Meeting & NOAA-led IPCC-observation meeting, Asheville, NC.

Spr-Sum 2010: Initial work started at JPL for prototyping data preparation, documentation and planning for ESG implementation.

October 2010: Briefing/update to WGCM on initiative progress.

October 2010 : NASA Datasets for IPCC Workshop hosted by PCMDI – identify requirements and NASA or closely-related data sets readily available for CMIP5/AR5 analysis.

November 2010 : NASA IT for IPCC Workshop hosted by GSFC – identify IT resources and requirements for supporting IPCC ARx.

October 2011: Briefing/update to WGCM & WGNE on initiative progress.

Fall 2011: Deliver a number of satellite datasets that are formatted, documented, sampled (e.g. monthly, daily) in a manner analogous to the model outputs, make available via ESG – tagged as “obs4MIPs”

October 2011: Recommendation to WCRP to foster activity via Observation Data Council.

[December 2012: NASA forms Science Working Group to shepherd NASA component of activity and provide guidance/leadership for including additional agencies/datasets.](#)

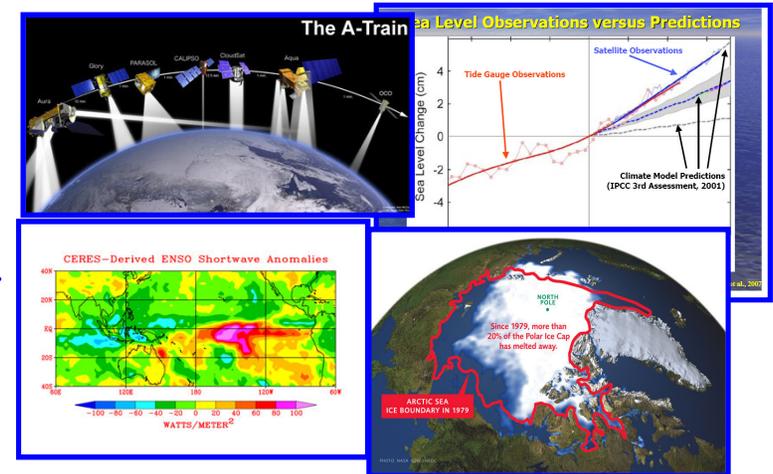
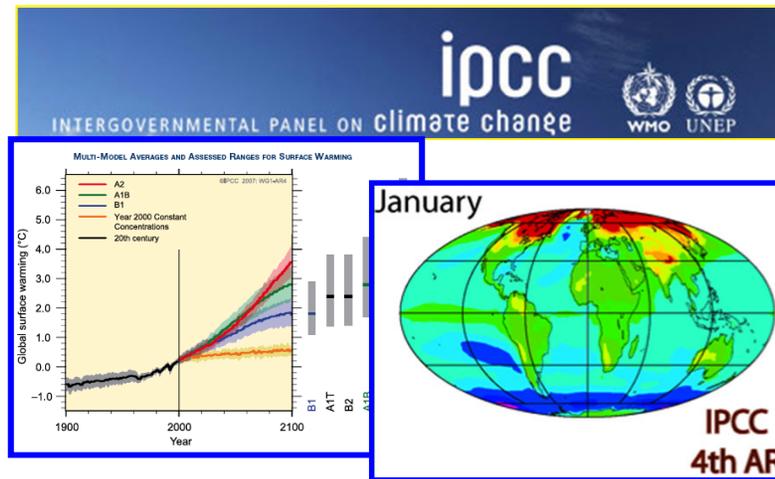
March 2012: Obs4MIPs wiki page made public and highlighted at CMIP5 Hawaii Workshop.

April 2012: Obs4MIPs briefing at CEOS-Climate Workshop, Asheville to broaden agency participation.

[May 2012: 1st NASA obs4MIPs Science Working Group Meeting](#)



(Satellite) Observations and CMIP/IPCC: Better Linkage



How to bring as much observational scrutiny as possible to the IPCC process?

How to best utilize the wealth of Earth observations for the IPCC process?

AR5 – initial target
AR6 and other MIPs – long-term targets



Model and Observation Overlap

For what quantities are comparisons viable?

ESG Gateway hosted by the Program for Climate Model Diagnosis and Intercomparison

Search Categories: Project, Data, Diagnostics, Model, Experiment, Product, Results, Metrics, Resources

PCMDI: The Program for Climate Model Diagnosis and Intercomparison (PCMDI) was established in 1989 at the Lawrence Livermore National Laboratory (LLNL), located in the San Francisco Bay area. Our staff includes research scientists, computer scientists, and diverse support personnel.

The PCMDI mission is to develop improved methods and tools for the diagnosis and intercomparison of general circulation models (GCMs) that simulate the global climate. The need for innovative analyses of GCM climate simulations is apparent, as increasingly more complex models are developed, while the disagreements among these simulations and relative to climate observations remain significant and poorly understood. The nature and causes of these disagreements must be accounted for in a systematic fashion in order to confidently use GCMs for simulation of future global climate change.

Quick Links: Getting Started Guide, Create Account, Browse Catalog, Search for Data, ESG Data Reference

CMOR Table Atmos: Monthly Mean Atmospheric Fields and Some Surface Fields

(All Saved on the Atmospheric Grid)

Taylor et al. 2008

Property	long name	units	comment	specimen	output variable name
1	Near Surface Air Temperature	K	near surface (canopy, 2 meter) air temperature		tas
1	Surface Temperature	K	"skin" temperature (i.e., SST for state ocean)		ts
1	Daily Maximum Near Surface Air Temperature	K	monthly mean of the daily maximum near surface (canopy, 2 meter) air temperature		tasmax
1	Daily Minimum Near Surface Air Temperature	K	monthly mean of the daily minimum near surface (canopy, 2 meter) air temperature		tasmin
1	Sea Level Pressure	Pa	sea, in general, the same as surface pressure		psl
1	Surface Air Pressure	Pa	sea, in general, the same as mean sea level pressure		ps
1	Eastward Near Surface Wind	m s ⁻¹	near surface (canopy, 10 meters) eastward component of wind		uas
1	Northward Near Surface Wind	m s ⁻¹	near surface (canopy, 10 meters) northward component of wind		vas



Example: Current NASA Missions ~14
 Total Missions Flown ~ 60
 Many with multiple instruments
 Most with multiple products (e.g. 10-100s)
 Many cases with the same products

Over 300 Variables in (monthly) CMIP Database



Over 1000 satellite-derived quantities

~120 ocean
 ~60 land
 ~90 atmos
 ~50 cryosphere



Some Basic Tenets of the obs4MIPs Activity

1. Use the **CMIP5 simulation protocol** (Taylor et al. 2009) as guideline for deciding which observations to stage in parallel to model simulations.
Initial Target is monthly averaged (OMON, AMON) products on 1 x 1 degree grid
Must be a direct match with CMIP5 model output variable
2. Convert (Satellite) Observations to be formatted exactly the same as CMIP Model output
CMOR output, NetCDF files, CF Convention Metadata, CMIP standard pressure levels, CMIP standard data file organization
Not a new product. At most – bin and average L2 data to produce the L3 product. Independent QC check before release.
3. Includes a 6-8 page **Technical Note** describing strengths/weaknesses, uncertainties, dos/don'ts regarding interpretations comparisons with models. (**at graduate student level**)
4. Host side by side on the ESG with CMIP5
5. Advertise availability of observations for use in CMIP5 analysis.



NASA-related Datasets for CMIP5

Datasets are Gridded Monthly Averages – Unless otherwise noted
 Separate files containing Nobs & StdErr for each grid cell are available

CMIP Protocol Variables	Data Source	Time Period	Comments
ta - Atm Temp	AIRS (≥ 300 hPa) MLS (< 300 hPa)	9/02 – 8/04 -	AIRS +MLS needed to cover all pressure levels
hus - Specific Humidity	AIRS (≥ 300 hPa) MLS (< 300 hPa)	9/02 – 8/04 -	
tro3 – Mole Fraction of Ozone	TES	2004 -	Undergoing QC checks
tos - Sea Surface Temperature	AMSR-E	6/02 -	SST science team recommends multiple products
rlut, rlutcs, rsdt, rsut, rsutcs – TOA outgoing LW & SW Radiation, Incident SW Radiation	CERES	3/00 -	
clt – Total Cloud Fraction	MODIS	2/00 -	
zos - Sea Surface Height Above Geoid	TOPEX/JASON series	10/92 -	AVISO Product
pr - Total precipitation	TRMM	1997 -	Monthly Ave + 3 hourly products
sfcWind, uas, vas - Surface (10m) zonal wind	QuikSCAT	1999 – 2009	Oceans only. No land products.
Land Surface products (TBD)	MODIS	2/00 -	Perhaps 2 CMIP variables, TBD

Match up of available NASA datasets to PCMDI priority list

Orange datasets are still in process



NASA obs4MIPs Science Working Group

- **Why a Science Working Group?**

- The initial effort targeted a small list of CMIP variables thought to be of highest priority
- As obs4MIPs matures, additional datasets will be useful for model evaluation and diagnosis
- There are many satellite observational data sets for the some CMIP variables (different source, different versions, different coverage, ...)
- There are many CMIP variables with no viable satellite observations
- There are satellite observations that could be useful – but don't have CMIP experiment outputs
- Observational scientists and modelers input is needed to prioritize the next steps, enroll additional dataset providers, and help shape the output requirements for future CMIP experiments

- **NASA Working Group:**

- **D. Waliser/JPL (Chair) - Atmosphere**
- **A. da Silva/GSFC, K. Bowman/JPL – Atmosphere Composition and Aerosols**
- **C. Peters-Lidard/GSFC, R. Nemani/ARC – Land**
- **S. Platnick/GSFC, N. Loeb/LaRC – Cloud & Radiation**
- **F. Landerer/JPL - Ocean**
- **P. Gleckler (PCMDI), J. Bates (NOAA)**

- **Next Foci: Satellite simulators, Land products, Aerosols**

- **A priority now is to increase collaboration with other agencies and international partners to expand this effort, and solicit feedback from model analysis community.**
- **We have proposed that WCRP/WDAC shepherd it at the highest level, to provide guidance and oversight.**



Recommendation

What role could WDAC play for Obs4MIPs?

- General oversight on the advancement of Obs4MIPs
e.g., via annual updates provided to WDAC, and along the lines of the AMIP and CMIP panels established by the WGNE and WGCM to guide climate model intercomparisons.

WDAC establish an Obs4MIPS panel to:

- Ensure that the datasets contributed to Obs4MIPs are appropriate for model evaluation
- Advance guidelines that are used to recommend, select and document the data
- Identify the highest priority observations for model diagnostics and evaluation
- Encourage additional contributions to Obs4MIPs and promote activity

WDAC Obs4MIPs panel membership and organization

- NASA volunteer to chair the group and provide some support for annual meetings
- Membership should consist of a mix of observation providers and model experts
- WDAC/WCRP to recommend members
- Obs4MIPs to report annually to WDAC/WCRP and WMAC/WCRP



obs4MIPs SUMMARY

- NASA-PCMDI pilot Project to establish a (satellite) observation capability for the climate modeling community to support model-to-data intercomparison. This involves IT, satellite retrieval, data set, modeling and science expertise. Satellite observation data sets being published now.
- ~16 satellite-based datasets currently available on the ESG – more coming.
- **A priority now is to increase collaboration with other agencies and international partners to expand this effort, and solicit feedback from model analysis community.**
- NASA has formed a Science Working Group, including reps from PCMDI and NOAA to help guide the expansion and direction of this activity.
- **We seek to have a component of WCRP shepherd it at the broadest level, and we believe WDAC may be ideally suited to provide guidance and oversight.**



ESG Gateway : Side by Side Archive with CMIP

Earth System Grid
Home Data Account About Contact Us Login

ESG Gateway hosted by the Program for Climate Model Diagnosis and Intercomparison

Search: Datasets for: [] Search

To conduct a search, select a category from the pull down menu and/or enter free text into the text box.

Search Categories

- Project
 - > CMIP5
 - > TAMIP2
 - > gfdl_test
 - > obs4MIPs
- + Institute
- + Model
- + Experiment
- + Frequency
- + Product
- + Realm
- + Variable
- + Ensemble

Welcome to PCMDI

PCMDI

The Program for Climate Model Diagnosis and Intercomparison was established in 1989 at the Lawrence Livermore National Laboratory located in the San Francisco Bay Area. Our staff includes research scientists, computer scientists, and administrative personnel.

The PCMDI mission is to develop improved methods and tools for the diagnosis and intercomparison of general circulation models (GCMs) to simulate the global climate. The need for innovative analysis and interpretation of climate simulations is apparent, as increasingly more complex models are being developed, while the disagreements among these simulations are increasing. The PCMDI mission is to improve our understanding of climate system processes and to provide a framework for the development of improved GCMs for simulation and prediction.

obs4MIPs Project

Status of the CMIP5 Archive

6/3/2011: CNRM-CERFACS decadal hindcast/forecast datasets are available for all realms but sea-ice (10 members already available for all realms ocean, only 3 so far for realms land/atmos/landIce).

6/25/2011: PCMDI CMIP5 data server is back online. The INM datasets are available.

7/7/2011: NCC datasets are now available to all users.

7/19/2011: PCMDI data server will be down for maintenance on 7/19/2011. It is expected back online 7/20 17:00 PST.

7/20/2011: PCMDI data server is back online.

7/20/2011: Because of a processing fault affecting the MOHC reanalysis data from 2080 onwards, this data has been withdrawn from the archive. They expect to provide us with corrected data in a format at which time a new version of these datasets will be published.

9/7/2011 - 9/9/2011: The BADC ESGF system will be unavailable on September 7th and 8th. As a precaution you should consider "At Risk" on Friday September 9th.

Earth System Grid
Home Data Account About Contact Us Login

ESG Gateway hosted at the NASA Jet Propulsion Laboratory

Search: Datasets for: [] Search Start Over

To conduct a search, select a category from the pull down menu and/or enter free text into the text box.

Please note that the NASA datasets accessible through this gateway are provided as part of an experimental activity to increase the usability of NASA satellite observational data for the model and model analysis communities. These are not standard NASA satellite instrument products. They may have been reprocessed, reformatted, or created solely for comparisons with the CMIP5 models. Community feedback to improve and validate the dataset for modeling usage is appreciated.

Search Categories

- Project
 - > CMIP5
 - > obs4MIPs
- + Institute
- + Model
- + Experiment
- + Frequency
- + Product
- + Realm
- + Variable

AIRS (Atmospheric Infrared Sounder)

AIRS Data Catalog at ESG
Documentation: Air Temperature
Documentation: Specific Humidity
AIRS Home at NASA/JPL

AMSR-E (Advanced Microwave Scanning Radiometer - EOS)

AMSR-E Data Catalog at ESG
Documentation
AMSR-E Home at NSIDC

AVISO

AVISO Data Catalog at ESG
Documentation: Sea Surface Height (SSH)
AVISO Home

MLS (Microwave Limb Sounder)

MLS Data Catalog at ESG
Documentation: Specific Humidity
Documentation: Air Temperature
MLS Home at NASA/JPL

MODIS (Moderate Resolution Imaging Spectroradiometer)

MODIS Data Catalog at ESG
Documentation
MODIS Home

TES (Tropospheric Emission Spectrometer)

TES Data Catalog at ESG
Documentation: Ozone
TES Home at NASA/JPL

Quick Links

- Getting Started Guide
- Create Account
- Browse Catalogs
- Search for Data

ESG Federation

- PCMDI Gateway
- BADC Gateway
- DKRZ Gateway
- NASA JPL Gateway
- NCAR Gateway
- NCI Gateway
- ORNL Gateway
- NERSC Gateway



obs4mips Wiki : A framework is being developed to expand the list of contributors

FrontPage - Obs4MIPS

http://obs4mips.llnl.gov:8080/wiki

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Titles Text

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Obs4MIPSWiki: FrontPage

RecentChanges FindPage HelpContents FrontPage

Immutable Page Info Attachments More Actions:

Obs4MIPs

A pilot activity to make observational products more accessible for climate model intercomparisons

Overview

A wide variety of observationally-based datasets are used for climate model evaluation. Obs4MIPs refers to a limited collection of well-established and documented datasets that have been organized according to the [CMIP5](#) model output requirements and made available on the ESG. Each Obs4MIPs dataset corresponds to a field that is [output in one or more of the CMIP5 experiments](#). This technical alignment of observational products with climate model output can greatly facilitate model data comparisons. Guidelines have also been developed for Obs4MIPs product documentation that is of particular relevance for model evaluation. This effort has been initiated with support from NASA and DOE with the intent of enabling additional data providers to contribute products ([origins of obs4mips](#)).

To summarize, products available via Obs4MIPs are:

- Directly comparable to a model output field defined as part of CMIP5
- Open to contributions from all data producers that meet the Obs4MIPs requirements (see below)
- Well documented, with traceability to track product version changes
- Served through ESGF

Products

- [NASA products](#)
- [DOE ARM products](#)
- NOAA products (in preparation)

Other agencies have expressed interest in preparing observational products for Obs4MIPs. The organization of Obs4MIPs data on this wiki is expected to evolve as the diversity of observational datasets diversifies.



“Technical Note”

Each Dataset has an accompanying Technical Note
Target audience is modeling and model-evaluation community
members who often have little experience with the given
dataset of interest.

Content

Intent of the Document/POC

Data Field Description

Data Origin

Validation and Uncertainty Estimate

Considerations for Model – Observation Intercomparison

Instrument Overview

References

Revision History

