WDAC Overview

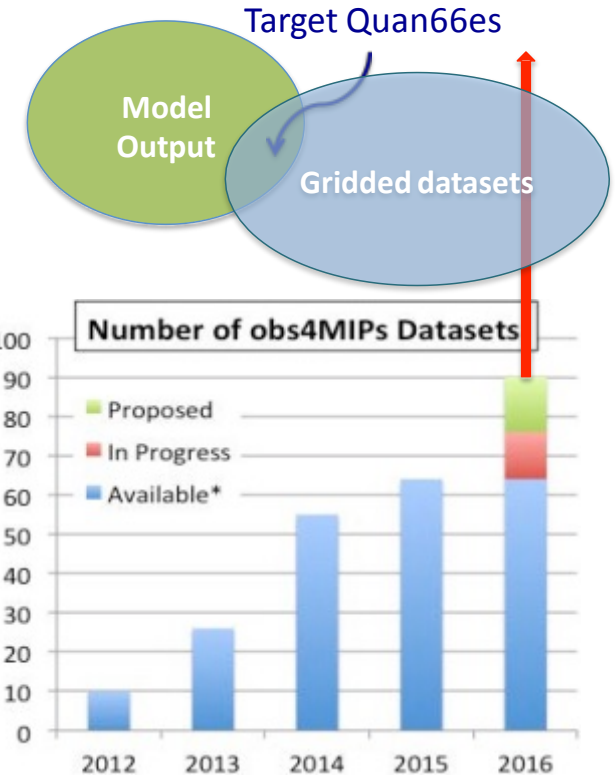
WDAC Activities

- “The WCRP Data Advisory Council (WDAC) acts as a focal point for all WCRP data, information, and observation activities with its sister programmes, and coordinates their high-level aspects across WCRP”
  - Coordinates with GCOS: AOPC, TOPC, OOPC
  - Interactions with SPARC, CliC, GEWEX and CliVar
  - Activities: Obs4MIPS, Surface Fluxes Task Team), Reanalyses (TIRA)

obs4MIPs

hKps://www.earthsystemcog.org/projects/obs4mips/

- A project for iden6fying, documen6ng and dissemina6ng observa6ons for climate model evalua6on in WCRP model intercomparisons, notably CMIP.
- Data (and tech notes) accessible with the distributed CMIP model output, adhering to same conven6ons
- Guided by the WCRP Data Advisory Council obs4MIPS Task Team



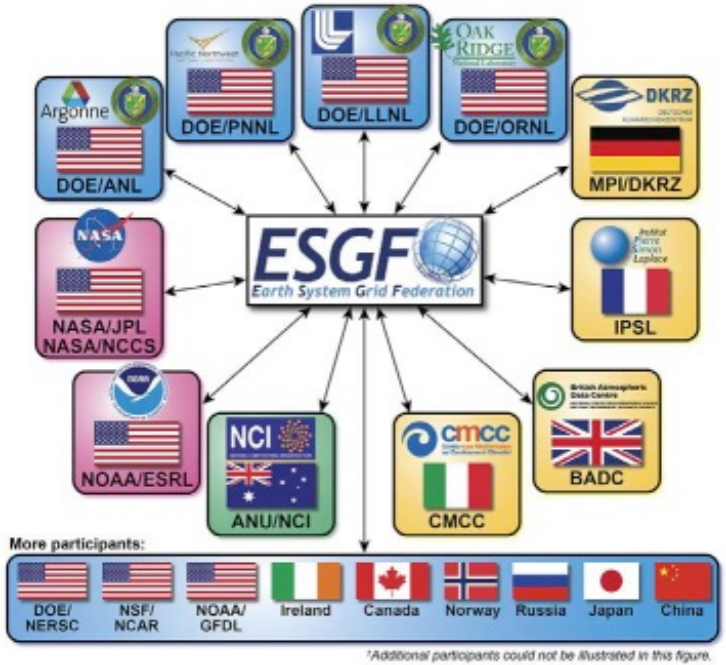
Complete (~125*)
In Progress* (~15)
Proposals from Data Call (~100)

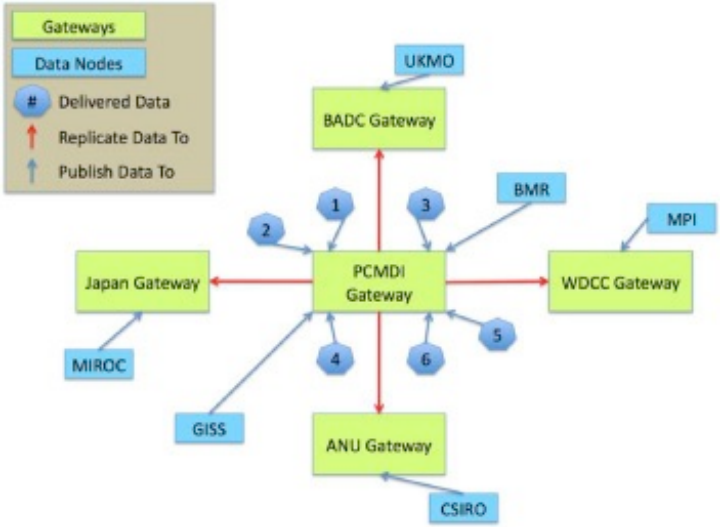
…. and growing!

Data accessibility for WCRP projects

obs4MIPs

The Earth System Grid Federa6on (**ESGF**) is being used for **CMIP6** and other WCRP projects





[ESGF Dec 2016 conference report (Williams et al., 2017)]

[ESGF Dec 2017 Recap] (final report in prepara6on)

New platforms: challenges/opportunities

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SurFlux Task Team: Activities

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- Representatives at GEWEX, CLIVAR, SOLAS, and other meetings; significant contributions to OceanObs paper
- A webpage dedicated to SurFlux has been established on the CoG: https://www.earthsystemcog.org/projects/surflux/

Current SurFlux recommendations

- Surface flux networks need to connect water, energy, and carbon measurements to make significant progress
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- For satellite estimations of both radiative and turbulent fluxes, improved BL properties of water vapor and temperature profiles needed
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- More focus on complex and highly variable areas (coastal zone, ice edge, …)
- Need to determine how best for limited in situ observations to inform gridded products
- Stronger connection between modeling and observations
- Measurements that are particularly needed for progress:
  - Temperature, humidity, and velocity profiles
  - Flux profiles
  - PBL top & entrainment flux
  - Soil moisture

SOLAS (Surface Ocean - Lower Atmosphere Study)

Theme 1: Greenhouse gases and the oceans
Theme 2: Air-sea interface and fluxes of mass and energy
Theme 3: Atmospheric deposition and ocean biogeochemistry
Theme 4: Interconnections between aerosols, clouds, and marine ecosystems
Theme 5: Ocean biogeochemical control on atmospheric chemistry.

Science and society:
Shipplumes

Development of scientific plan (webpage)
Annual SSC meetings
Summer school 2018
Scientific conferences (next 2019)
Workshops:
remote sensing and surface fluxes
shipplumes

WCRP Task team for the Intercomparison of ReAnalyses (TIRA): Motivation and Progress

Michael Bosilovich, Masatomo Fujiwara,
Jan Keller and Matthias Tuma

(with input from the TIRA telecons)

Need for international collaboration regarding reanalyses

- WCRP Data Advisory Council (WDAC) generally organizes a regular (every 4-5 years) international conference on reanalyses
- WDAC generally has reviewed reanalyses activities at annual meeting
- Otherwise, there is no specific international collaborative group for reanalyses development and users
- Reanalyses data gets wide use across the WCRP spectrum of panels and working groups
- Reanalysis.org is a grass roots community effort to provide a knowledge base for all things reanalysis

Main Objectives of TIRA

The primary charge to the TIRA is to develop a reanalysis intercomparison group that will attain the following objectives.

1) To foster understanding and estimation of uncertainties in reanalysis data by intercomparison and other means
2) To communicate new developments and best practices among the reanalyses producing centers
3) To enhance the understanding of data and assimilation issues and their impact on uncertainties, leading to improved reanalyses for climate assessment
4) To communicate the strengths and weaknesses of reanalyses, their fitness for purpose, and best practices in the use of reanalysis datasets by the scientific community

Objectives of the new *Group*

- Group – need to determine if it is a group, committee or panel AND a name (which should reflect what will be done)
- Provide a conduit between reanalysis developers and users to better understand and utilize the many forms of **Earth system** reanalyses
- Provide a resource for best practices and standards in reanalysis intercomparison and evaluation (maintaining history/legacy at ***reanalysis.org***)
- Manage and guide reanalysis intercomparison projects and resources for WCRP science communities
  - May develop new projects or collaborate with WCRP communities to develop new projects
- Promote and encourage the use of reanalyses with the diverse disciplines related to societal interests and needs, climate services and decision making

Organization

- Membership – NWP Centers developing reanalyses, discipline specific community members (e.g. Ocean reanalysis), WCRP panel representatives, at-large scientific community members
  - 2-3 co-chairs, spread the work and meetings
  - 3 year terms, renewable but finite, to promote innovation and energy (may be be challenging in a smallish community)
- Will manage projects, committee may also participate/lead
  - Reanalysis Intercomparison Projects (RIPs) for evaluating intercomparing various reanalyses
  - Working Groups (WGs) for addressing targeted issues or providing guidance or position statements

WCRP Implementation

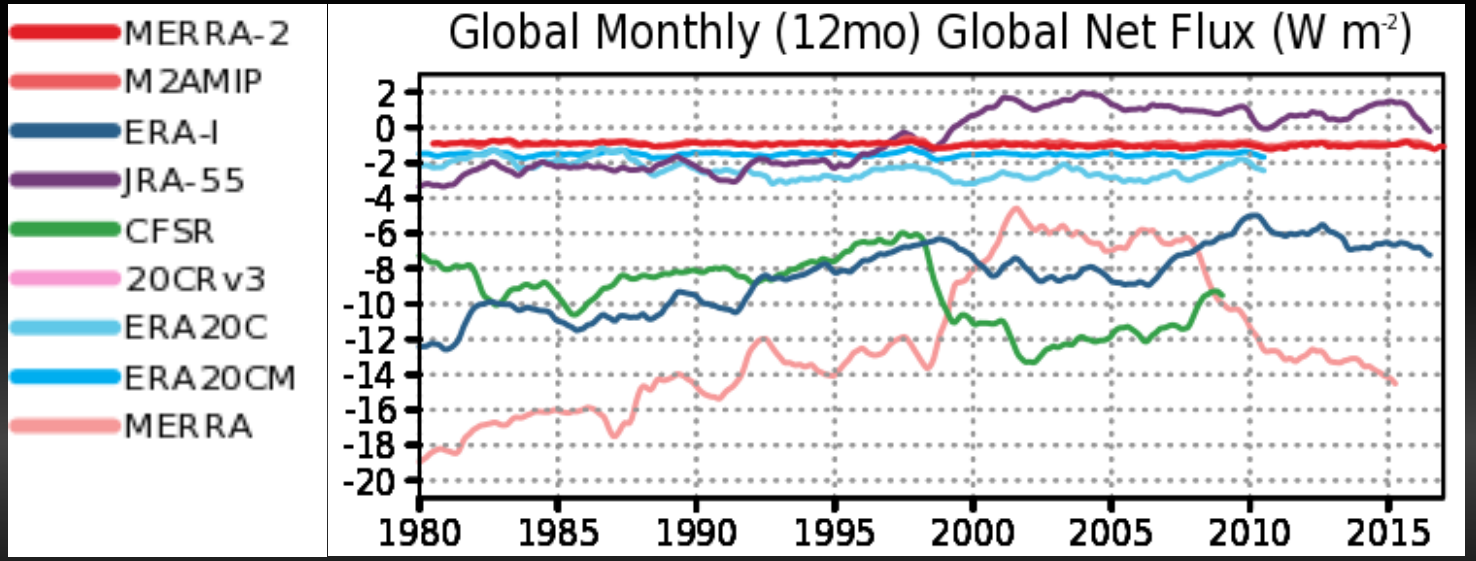
- Last Year, WCRP developed a new strategic plan, so its organizational structure may be changing substantially
- Within the new Strategic Plan the proposed reanalysis group fits
  - Objective One, Fundamental Understanding of the Climate System (reanalyses as an observation-based tool for Earth System science)
  - Objective Four, Bridging Climate Science and Society
  - Critical Infrastructure through Simulation Tools, Observations and High-end Computing / Data Management
- TIRA will submit a proposal for this group to the WDAC/JSC for consideration in the new implementation of WCRP

Pilot Intercomparison

- At ICR5 (Rome, Nov 17) group discussion on next steps needed to define a WCRP Project for the Intercomparison of Reanalyses
- Document – develop a document that highlights best practices and terms of reference
- Somewhat more interest: Develop one (or more) **Pilot Intercomparison Project(s)** that some in the team can start, with a goal of real world experience interacting in group activities that have some direct affect on TIRA and the participants

- Regional Project - Precipitation
- Possible Global Topics
- [1] Surface temperature
- [2] Ocean surface fluxes
- [3] Precipitation
- [4] Radiation
- [5] **Energy budget**
- [6] Water cycle
- [7] Surface Winds (Wind Energy)

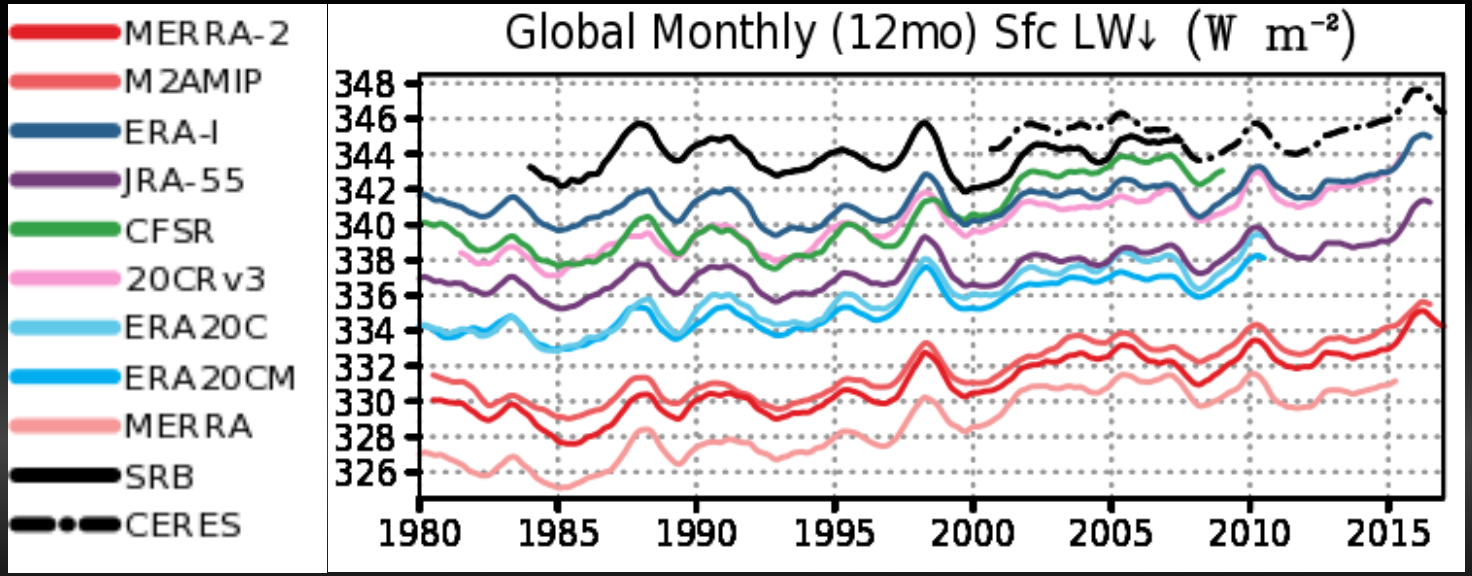
Energy Budget Pilot Study



Net Global Heating: TOA minus Sfc Net

- Model and Reduced observing reanalyses have smallest most consistent net atmospheric heating
- Changing observing system affects the energy budgets of all satellite data reanalyses
- Significant improvements going from MERRA to MERRA-2
- MERRA-2 includes the heating due to the analysis, adding that into the budget brings the net heating to nearly the same value as the MERRA-2 AMIP model.

Energy Budget Pilot Study



Downward Longwave Radiation at the Surface

- MERRA, MERRA-2 and M2AMIP use Chou Suarez radiation parameterization. This underestimates cloud effects, so the LW down is biased low. This is being addressed for future reanalyses.
- GEWEX Surface Radiation Budget - a new version is coming “soon”
- This is determined by the atmospheric temperature and cloud effect

Possible Initial Projects and Working Groups

- Proposal – Sending to WDAC Mar 8 (then to JSC)
  - Energy Budget: In collaboration with GDAP Global Energy observations
  - Collaborate with WGNE on their MJO Task Force (promising initial telecon)
  - Working Group on Intercomparison Data Systems (e.g. CREATE and WRIT
  - Working Group on Climate Services, Decision Making and Applications
- Within the 10 years of this strategic plan, expect to see several Earth System Reanalyses produced

Task Team Members

- Magdelena Balmaseda (ECMWF/CLIVAR)
- Michael Bosilovich (NASA/ GMAO Co-Chair)
- Cathy Smith (CIRES/WRIT)
- Gil Compo (CIRES/20CR)
- Masatomo Fujiwara Co-Chair (Hokkaido U./SPARC/S-RIP)
- Jan Keller Co-Chair (DWD/ Regional Reanalysis)
- Hans Hersbach (ECMWF)
- Shinya Kobayashi (JMA)
- Wesley Ebisuzaki (NOAA/EMC)
- Remy Roca (GEWEX)
- Chenghu Sun (CMA/NMIC)
- Andrea Storto (CCMC)
- Gerald Potter (NASA/CREATE)
- Otis Brown (NCSU/WDAC)
- Matthais Tuma (WCRP)

Thanks!

Michael.Bosilovich@nasa.gov

http://reanalyses.org/atmosphere/wcrp-task-team-intercomparison-reanalyses-tira

Surface Flux Task Team Members

[https://www.earthsystemcog.org/projects/surflux/]

- Carol Anne Clayson, co-chair (WHOI, ocean, satellite)
- Anna Rutgersson, co-chair (Uppsala University, ocean/lake, obs)
- Martin Jung (Max Planck, biosphere, obs);
- Jim Edson (WHOI, ocean, obs);
- Pierre-Philippe Mathieu (ESRIN, satellite);
- Peter Gleckler (LLNL, modeling);
- Ronald Buss de Souza (National Institute for Space Research, Brazil, ocean, obs)
- Paul Stackhouse (NASA Langley, radiative fluxes, satellite);
- Diego Miralles (U. Ghent, biosphere, satellite);
- Anton Beljaars (ECMWF, land, modeling);
- Kauhito Ichii (Chiba University, land, obs);
- Petra Heil (University of Tasmania, sea ice, obs, remote sensing, modeling);

SurFlux Terms of Reference

1. Provide a single point-of-contact for surface flux observations and analysis in the WCRP. Communicate with other relevant entities regarding WCRP surface flux activities through work on committees, a website, and other published articles and information.

2. Establish and encourage the publication and use of data, metadata, and documentation standards for global surface flux (ocean, land, or ice and atmosphere) data sets that are consistent with standards and infrastructure used in major climate model intercomparison efforts (e.g., CMIP, ESGF, and Obs4MIPs), thereby facilitating intercomparison of the data sets and their use in evaluation of Earth System models
and their components.

3. Establish conventions for intercomparisons of global datasets, and for assessment of the global datasets with available in situ data, making use of established assessments for other components of the Earth system from GEWEX and other WCRP entities.

4. Report to the WDAC and WCRP Core Projects (e.g., GEWEX/GDAP and CLIVAR) on progress, status, and plans for activities overseen by the Task Team.

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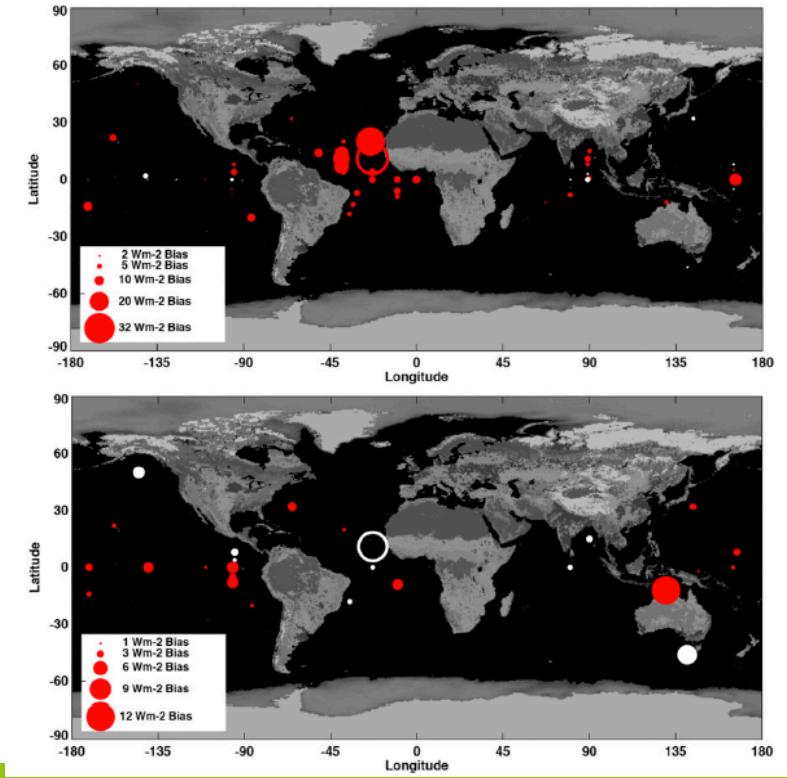
More activities

- Presentations to GSOP, US CLIVAR about SurFlux, discussions about our recommendations/activities
- Review of TPOS 2020 second report
- Identification of issues with radiation measurements over the ocean, subgroup meeting

Radiation subgroup



There is, as well, uncertainty is associated with surface observations. Irradiances measured at buoys might have a larger uncertainty. . . . We, however, do not have a separate uncertainty estimate for irradiances measured at buoys.

Kato et al. (2018)

Radiation subgroup

- Paul Stackhouse, Christian Lanconnelli, Meghan Cronin, Bob Weller, Diego Miralles (so far)
- Addressing radiation measurements from buoys/operational uncertainties/documentation
- FluxNet quality
- Initial goal: best practices document

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