TIRA Report to WDAC 8:
Initial plan for Earth System Reanalyses Intercomparison and Evaluation

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Need for international collaboration regarding reanalyses

• WCRP Data Advisory Council (WDAC) generally organizes a regular (every 4-5 years) international conference on reanalyses
• WDAC reviews reanalyses activities at annual meeting
• Reanalysis.org is a grass roots community effort to provide a knowledge base for all things reanalysis
• Other than TIRA, GSOP considering ocean reanalyses, SRIP for stratosphere, and WGNE considers the data assimilation in atmosphere reanalyses
• However, reanalyses data play a role across the WCRP spectrum of panels and working groups
Main Objectives of TIRA

The primary charge to the TIRA is to develop a reanalysis intercomparison group for WCRP with 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 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
Regarding WCRP’s new strategic plan, the 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 proposal provides more details for consideration in the new implementation of WCRP
Pilot Intercomparison: Initial project

• 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

- Earth System Reanalysis Intercomparison and Evaluation
  - 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
Thanks!

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