Report on the NOAA Reanalysis Panel Meeting
(22-24 July 2008)

presented by
S. Schubert (panel chair)

Climate Working Group Fall 2008 Meeting
University of Maryland, ESSIC
November 24-25, 2008
Panel Members

- S. Schubert (chair, NASA GMAO)
- Don Anderson (NASA HQ)
- Jeff Anderson (NCAR)
- Masao Kanamitsu (Scripps)
- Adrian Simmons (ECMWF)
- Karl Taylor (PCMDI/DOE)
- Mike Wallace (Univ. Washington)
- Anjuli Bamzai (ex-officio, DOE)
Charter

• provide guidance to NOAA on all aspects of reanalysis priorities and what its role should be in the context of other national and international reanalysis activities.

• In addition, Chet Koblinsky asked that the advice include guidance on how to facilitate an IESA capability, computational needs, identifying major gaps in capabilities, and assessing the adequacy of the leadership structure.
Background

• In FY07 NOAA received new funding (approximately $2M/yr) for project entitled “Explaining Climate to Improve Predictions”

• Funding comes through NOAA’s Climate Program Office. Chet Ropelewski is the program manager and Randy Dole is the designated project lead.

• Internal implementation team that includes members from NOAA’s Earth Systems Research Laboratory (ESRL), the National Climatic Data Center (NCDC), the Climate Prediction Center (CPC), and the Environmental Modeling Center (EMC).

• The panel was briefed on the various on-going and planned NOAA reanalysis and related activities.
Findings and Recommendations

A. Overall
B. CFSRR
C. Plans for Post-WWII Reanalysis and a Sustained Reanalysis Activity
D. Historical Reanalysis
E. NCDC Observational Data Archiving and Development
F. GFDL Predictability Studies and Reanalysis
G. A Sustained Reanalysis Activity and a Path to IESA_
A. Overall

- Recognition of NOAA leadership in reanalysis, including NCDC leadership in the collection, management and distribution of historical observational data.
- Need for better coordination and management of current and planned reanalysis and related activities across the various NOAA lines of management, and clearly identify how these activities link to NOAA priorities and user needs.
- The panel strongly recommends that NOAA develop a science and implementation plan for a sustained climate reanalysis activity, leading to IESA.
  - IESA needs to be an interagency effort
  - NOAA needs to meet computational needs
B. CFSRR

- impressed by the progress made in the development of the system.
- progress in responding to the CFSRR advisory panel to address the needs of the broader user community and encourages further effort in this regard
- Concern about little progress on finalizing a data archival and delivery system for CFSRR - appears to be primarily a management issue
- Encourage NCEP to expedite transferring the CFSRR data to the NCDC archive.
- Concern about difficulties the CFSRR project experienced in obtaining sufficient computing resources.
- Urge stronger interactions with the MERRA project.
C. Plans for Post–WWII Reanalysis

- Supportive but concern that insufficient attention to why such an activity be carried out at NCEP on a sustained basis.

- **Endorse** plan for replacing the first generation reanalyses to meet needs of CPC and other NOAA climate activities (run CFSRR once over the earlier data).

- **Recommend** that the Post-WWII effort form the basis for the development of a sustained climate reanalysis activity that
  - tackles issues fundamental to improving the consistency and quality of climate reanalyses,
  - work towards expanding the scope of the reanalyses to include all relevant components of the Earth System.
  - Allows possible new data assimilation technology (e.g., time window).
  - Must also be able to influence the priorities of the EMC model development.
d. Historical Reanalysis

- highly supportive of this effort and applauds the strong collaboration between ESRL, and NCDC and the international community on the development of the input observational dataset
- urge strong coordination between this activity and EMC to ensure that the appropriate model version is used in the next phase of this activity
- pleased to learn that GFDL will use this product in their decadal predictability studies
- recognizes that this will remain primarily a research effort, and looks forward to seeing further exploratory studies that use additional data, and address model dependence issues.
e. NCDC Observational Data Archiving and Development

- strongly supportive of NCDC’s efforts to develop climate data sets of in-situ observations. NCDC is now recognized within WMO and GCOS as the world leader.
  - pleased that NCDC is collaborating with NCAR to compare and improve data inventories for reanalysis
- maintaining this effort and assuring that the coming and planned reanalyses (e.g., CFSRR, historical, and post-WWII) will be adequately supported for data archival and distribution will require additional sustained support from NOAA.
- Urge NOAA to ensure that NCDC has necessary resources to support improvement of climate data records for reanalysis, as well as to sustain the international coordinating and support activities.
f. GFDL Predictability Studies and Reanalysis

• The panel was impressed by work that is going on at GFDL on decadal predictability - GFDL is a recognized leader in this area

• The panel applauds the link being established between this effort and the historical reanalysis effort (initializing and verifying the decadal predictions)

• The panel recommends that, if NOAA is to assume a leadership role in building an IESA, they must invest significantly in enhancing the number of scientists engaged in ocean reanalysis development. (would serve to enhance the S-I and decadal prediction activities at NCEP and GFDL)
g. A Sustained Reanalysis Activity and a Path to IESA

- strongly recommends that NOAA develop a science and implementation plan for a sustained climate reanalysis activity that
  - clearly identifies the roles and interactions of the various NOAA management lines
  - taps the external research community through a competitive research grants program
  - coordinates the NOAA activities with other related reanalysis activities both nationally and internationally
  - defines NOAA’s role (in partnership with other agencies) in the development of an Integrated Earth System Analysis (IESA) capability,
  - outlines the steps and resources required for developing the basic infrastructure of an IESA and achieving a fully operational state-of-the-art system within the next decade.

- IESA (that spans the atmosphere, ocean, land and biosphere) requires a truly interagency effort

- A successful effort will require that NOAA make a major commitment to meet computational needs.
g. A Sustained Reanalysis Activity and a Path to IESA -continued

- **recommend** that the post-war CFS/CPC effort form the basis for NOAA’s sustained reanalysis activity
- **recommend** that NOAA develop an organizational strategy that will facilitate a two-way interaction between EMC developments for NWP and the developments necessary for a sustained climate reanalysis activity leading to an IESA capability
- **recommend** that NOAA develop mechanisms that make the data assimilation system available to outside users (on a limited basis and in close coordination with NCEP)
  - As an example of a sustained reanalysis activity the panel recommends that NOAA form a working group on reanalysis observing system experiments with a charter that includes addressing model dependence.
- **encourage** NOAA to take the lead in developing an integrated database characterizing all aspects of the various reanalysis activities - something that could eventually become a portal to the various reanalyses.