NOAA Climate Reanalysis Task Force Technical Workshop

NOAA Center for Weather and Climate Prediction
College Park, MD

4 - 5 May 2015

Organizers: Jim Carton, Gilbert Compo, Arun Kumar, Suru Saha, Heather Archambault

Workshop Objectives:

• Report on NOAA Climate Reanalysis Task Force progress
• Exchange reanalysis approaches, algorithms, and techniques currently in use and under development.
• Discuss techniques for addressing outstanding issues in the reanalysis efforts, e.g., presence of spurious discontinuities and trends, coupling of Earth System components, inclusion of new areas such as aerosols.
• Identify the various requirements for reanalysis products.
• Determine strategies and overlaps for national and international reanalysis efforts based on scientific drivers for climate and weather research.

Each presentation slot is 80% for oral presentation and 20% for questions.

Monday 4 May

8:00–9:00 a.m. Registration

9:00 a.m. Welcome
Arun Kumar, NCEP/CPC

9:05 a.m. Introduction to the Climate Reanalysis Task Force and Workshop
Gil Compo, U. of Colorado/CIRES & NOAA/ESRL/PSD

9:20 a.m. What is Reanalysis for?
Huug van den Dool, NCEP/CPC

1. National and International Reanalysis Efforts

Objective: Determine strategies and overlaps for national and international reanalysis efforts based on scientific drivers for climate and weather research.

Session Chair: Gil Compo, U. of Colorado/CIRES & NOAA/ESRL/PSD
Rapporteur: Jeff Whitaker, NOAA/ESRL/PSD
9:40 a.m.  
*Plans for Reanalysis at NCEP’s Environmental Modeling Center*
Suru Saha, NCEP/EMC

10:00 a.m.  
*Issues, Requirements, and Research towards NOAA’s Next Generation of Climate Reanalyses*
Arun Kumar, NCEP/CPC

10:20 a.m.  
Coffee Break

10:40 a.m.  
*Reanalysis at ECMWF*
Dick Dee, ECMWF

11:00 a.m.  
*CMA 40-year GSI based reanalysis: plans and progress*
Zhiquan Liu, NCAR

11:20 a.m.  
*MERRA-2, GMAO reanalysis efforts/plans*
Ron Gelaro, NASA/GMAO

11:40 a.m.  
Discussion
Moderator: Heather Archambault, NOAA/CPO

12:10 p.m.  
Lunch

2. Developments in the Stratosphere

**Objective:** Discuss techniques for addressing outstanding issues in the reanalysis efforts

**Session Chair:** Ron Gelaro, NASA/GMAO  
**Rapporteur:** Erica Dolinar, U. of North Dakota

1:30 p.m.  
*Status at NCEP to improve the stratosphere in reanalysis*
Craig Long, NCEP/CPC

1:50 p.m.  
*Aerosol modeling*
Sarah Lu, SUNY-Albany

2:10 p.m.  
*Water vapor in the stratosphere*
John McCormack, Naval Research Laboratory

2:30 p.m.  
*Aerosol Reanalysis at NASA Goddard Space Flight Center*
Arlindo da Silva, NASA/GMAO

2:50 p.m.  
Discussion
Moderator: Dan Barrie, NOAA/CPO

3:10 p.m.  
Coffee Break
3. Assimilation Development and Experiments: Atmosphere

**Objectives:** Exchange reanalysis approaches, algorithms, and techniques currently in use and under development. Discuss techniques for addressing outstanding issues in the reanalysis efforts.

**Session Chair:** Arun Kumar, NCEP/CPC  
**Rapporteur:** Lisan Yu, WHOI

3:30 p.m. *Developments in the Ensemble Kalman Filter*  
Jeff Whitaker, NOAA/ESRL/PSD

3:50 p.m. *Forecast results and QBO response from NCEP conventional data only T254 EnKF only cycling semi-Lagrangian Reanalysis in 1970, 1981*  
Jack Woollen, IMSG & NCEP/EMC

4:10 p.m. *Hybrid Data Assimilation at NCEP*  
Daryl Kleist, U. of Maryland

4:30 p.m. *New applications of Data Assimilation to Reanalysis*  
Eugenia Kalnay, U. of Maryland

4:50 p.m. *Reanalysis for Tambora 1815*  
Gil Compo, U. of Colorado/CIRES & NOAA/ESRL Physical Sciences Division

5:10 p.m. Discussion  
Moderator: Gil Compo

5:30 p.m. Close for day

6:30 p.m. Informal dinner at Franklin’s
Tuesday 5 May

4. Assimilation Development and Experiments: Ocean and Sea ice

Objectives: Exchange reanalysis approaches, algorithms, and techniques currently in use and under development. Discuss techniques for addressing outstanding issues in the reanalysis efforts

Session Chair: Suru Saha, NCEP/EMC
Rapporteur: Yan Xue, NCEP/CPC

8:30 a.m.  NASA ocean data assimilation
Guilliame Vernieres, NASA/GMAO SSAI

9:00 a.m.  Impacts of ocean observations on NCEP GODAS analysis, Yan Xue, NCEP/CPC

9:15 a.m.  Advancing Ocean Data Assimilation and Reanalysis
Steve Penny, U. of Maryland & NCEP

9:30 a.m.  UMD SODA -- problems and progress
Jim Carton, U. of Maryland

9:45 a.m.  The development of NSST within the NCEP GFS/CFS
Xu Li, NCEP/EMC

10:00 a.m. Coffee Break

10:30 a.m.  ENSO in a large ensemble of historical reanalyses
Ben Giese, Texas A&M University

10:45 a.m.  Land data assimilation at NCEP/EMC
Mike Ek and Jesse Meng, NCEP/EMC

11:00 a.m.  Sea ice development at NCEP/EMC
Xingren Wu, NCEP/EMC

11:15 a.m.  Discussion
Moderator: Jim Carton, U. of Maryland

12:10 p.m.  Lunch
5. Reanalysis Evaluation
Objective: Identify the various requirements for reanalysis products.

Session Chair: Jim Carton, U. of Maryland
Rapporteur: Steve Penny, U. of Maryland

1:30 p.m.  Dry-mass conservation and water consistency in reanalysis
Ricardo Todling, NASA/GMAO

1:50 p.m.  Air-sea heat and freshwater fluxes in Atmospheric Reanalyses
Lisan Yu, Woods Hole Oceanographic Institute

2:10 p.m.  Impacts of NCEP Reanalysis R2 and CFSR fluxes on MOM4 simulations
Caihong Wen, NCEP/CPC

2:30 p.m.  Evaluation and intercomparison of clouds, precipitation, and radiation budgets in recent reanalyses using satellite-surface observations
Erica Dolinar, U. of North Dakota

2:50 p.m.  Coffee Break

3:10 p.m.  Investigation of two extreme summer Arctic sea-ice extent anomalies in 2007 and 1996
Xiquan Dong, U. of North Dakota

3:30 p.m.  Reanalysis evaluation in polar regions
Richard Cullather, NASA/GMAO

3:50 p.m.  Rapporteurs give 5 minute summary of their session

4:15 p.m.  Discussion and writing assignments
Moderator: Gil Compo

5:00 p.m.  Close of Workshop