



CGMS-39 WMO-WP-12
v1, 13 September 2011
Prepared by WMO
Agenda Item: E5
Discussed in Plenary

**FIRST ANNOUNCEMENT OF THE FOURTH WORLD CLIMATE RESEARCH
PROGRAMME (WCRP) REANALYSIS CONFERENCE**
In response to CGMS recommendation R38.03

The World Climate Research Programme (WCRP) is organizing an International Conference on Reanalyses, 7-11 May 2012 in Silver Spring, Maryland, USA.

Reanalyses represent a method of integrating satellite and in situ observations with models to produce continuous fields of global weather and climate data. Over the last 20 years, reanalyses have been a significant source of data for any studies of the atmosphere and ocean circulations at time scales from hours to decades. The data assimilation systems that provide the integration tools have improved over time with better models, data assimilation techniques and computer advances. New generations of reanalyses are providing higher resolution, more detailed output for diagnostic analysis and coupling between components of the Earth system. Observations are the essential element of reanalyses. As such, remote sensing represents a critical input to the reanalysis efforts worldwide. In turn, the remote sensing community may exploit the reanalysis products for remote sensing product validation and comparison. This holds true for all earth observation satellites, including meteorological in particular.

Action proposed:

CGMS members to note and consider participating in the 4th WCRP Reanalysis Conference in May 2012 in Silver Spring, MD, USA.

First Announcement of the Fourth World Climate Research Programme (WCRP) Reanalysis Conference

1 INTRODUCTION

The World Climate Research Programme (<http://www.wcrp-climate.org>) is organizing an International Conference on Reanalyses (<http://icr4.org/about.html>), 7-11 May 2012 in Silver Spring, Maryland, USA.

Atmospheric, oceanic and land retrospective analyses, or “reanalyses,” have become fundamental tools for weather, ocean, hydrology and climate research. They continue to evolve from improvements in data assimilation, numerical modeling, and observation recovery and quality control, and have become ultimately long-term climate and environmental records. Reanalyses are natural integrative tools, yet coupling the components of the Earth system in reanalyses remains a great challenge.

Reanalyses represent a method of integrating satellite and in situ observations with models to produce continuous fields of global weather and climate data. Over the last 20 years, reanalyses have been a significant source of data for many studies of the atmosphere and ocean circulations at time scales from hours to decades. The data assimilation systems that provide the integration tools have improved over time with better models, data assimilation techniques and computer advances. New generations of reanalyses are providing higher resolution, more detailed output for diagnostic analysis and coupling between components of the Earth system. Observations are the essential element of reanalyses. Surface pressure, representing the column integrated mass of the atmosphere, is available from the late 1800s. Sounding balloons became routinely and widely available in the 1940s. Satellite observations with reliable frequency and quality began around 1979. Ocean observations have likewise improved in time, where expendable bathythermographs (XBTs) and Conductivity, Temperature, Depth (CTDs) extended the depth of measurements from 300 m to 500–1000m in 1960. Satellite estimates of sea surface temperature and altimetry began in 1981 and 1992, respectively. In 2000, Argo observations began recording temperature and salinity to a depth of 2 km. Reanalyses integrate these into a unified set of data products to be used by researchers and other decision makers.

Reanalyses products are very valuable to researchers. However, they require thorough evaluation for each of the applications envisioned for them. Given their diversity and data volume, especially from remote sensing, and the wide range of potential applications, evaluations have to be undertaken by the broader community, as well as by the organizations producing them. To facilitate sharing of knowledge among the developers and users of these data sets, www.reanalyses.org has been established as a community wiki, where information and research results can be shared openly. The open nature of the page is a compromise between the thoroughness of peer review process and the length of time it takes to publish information. Further, www.reanalyses.org provides a central source of information across the multitude of reanalyses, linking many sources of information through a central hub. This is a pilot

project to gauge the community interest in sharing resources such as this, and will thrive only with the support of the community of developers and users.

2 ABOUT THE CONFERENCE

2.1 MOTIVATION & OBJECTIVES

Observations are the key resource in producing reanalyses, and improvements in algorithms and quality control are still advancing. Additional challenges remain to account for model bias as new data are assimilated and the observation record evolves (e.g., new instruments replace old). These issues are especially important for using reanalyses in climate research. Extending the reanalysis record back in time is a fundamental need of the weather and climate research community.

Considering these challenges, the 4th WCRP International Conference on Reanalyses will be convened with the objectives of:

1. Sharing understanding of the major challenges facing reanalyses: the changing observing system and Integrated Earth system.
2. Assessing the state of the disciplinary atmospheric, ocean and land reanalyses, including the needs of the research community for weather, ocean, hydrology and climate reanalyses.
3. Reviewing the new developments in the reanalyses, models and observations for study of the Earth System.
4. Exploring international collaboration in reanalyses including its role in regional and global climate services.

2.2 THEMES

The conference will address the following themes:

Status and Plans: Major international reanalysis development, including broad disciplinary overviews (e.g., atmosphere, oceans, hydrology, cryosphere).

Validation and Metrics: Intercomparison and validation studies; assessing the impact of the assimilation and analysis increments; innovative diagnostics that characterize the degree to which a reanalysis represents reality and ultimately applicability for weather and climate research.

Data Assimilation: Data assimilation techniques and impact on eventual reanalysis data products, especially producing a climate quality time series.

Space and In Situ Observations: Studies on the quality and stewardship of observations and their use in reanalyses and exploiting new data types and sources.

Applications in Support of Climate, Weather and Environmental Services: Innovative research using reanalysis to study the weather, ocean, hydrology and climate, including operational climate monitoring, study of extremes and high impact weather, climate assessment and end-to-end decision making studies.

International Collaborative Efforts: Projects and plans for developing and using reanalysis to the benefit of the international community.

2.3 EXPECTED OUTCOME

The following outcomes are expected from the conference

- The forum will foster communications between reanalysis development centers and the research community with a focus on an Earth System approach to reanalysis

- Enhanced collaboration of the international development centers

- Statement on the utility and need for reanalyses in weather, ocean, hydrology and climate studies for policy makers

- Identification of potential new areas for applications of reanalysis products

- Promotion of greater use of reanalysis and evaluation of strengths and weaknesses of reanalysis products

- Greater involvement of early career scientists and graduate students in reanalysis research and development

3 CONCLUSIONS

Reanalyses products are very valuable to researchers. However, they require thorough evaluation for each of the applications envisioned for them. Given their diversity and data volume and the wide range of potential applications, evaluations have to be undertaken by the broader community, as well as by the organizations producing them. To facilitate sharing of knowledge among the developers and users of these data sets, www.reanalyses.org has been established as a community wiki, where information and research results can be shared openly. The open nature of the page is a compromise between the thoroughness of peer review process and the length of time it takes to publish information. Further, www.reanalyses.org provides a central source of information across the multitude of reanalyses, linking many sources of information through a central hub. This is a pilot project to gauge the community interest in sharing resources such as this, and will thrive only with the support of the community of developers and users. Remote sensing represents a critical input to the reanalysis efforts worldwide. In turn, the remote sensing community may exploit the reanalysis products for remote sensing product validation and comparison. This holds true for all earth observation satellites, including meteorological in particular.