

**Update from the
European Centre for Medium-Range Weather Forecasts**

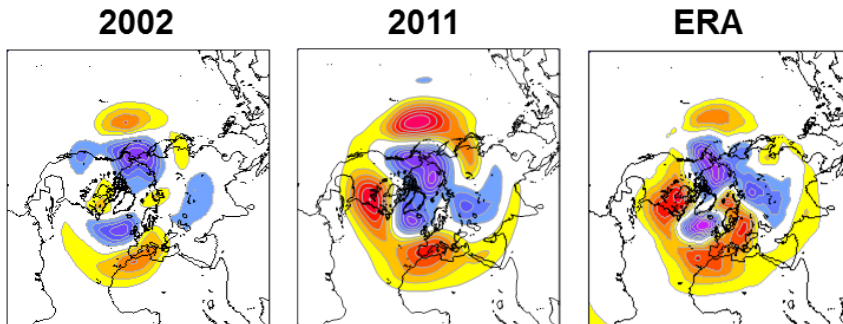
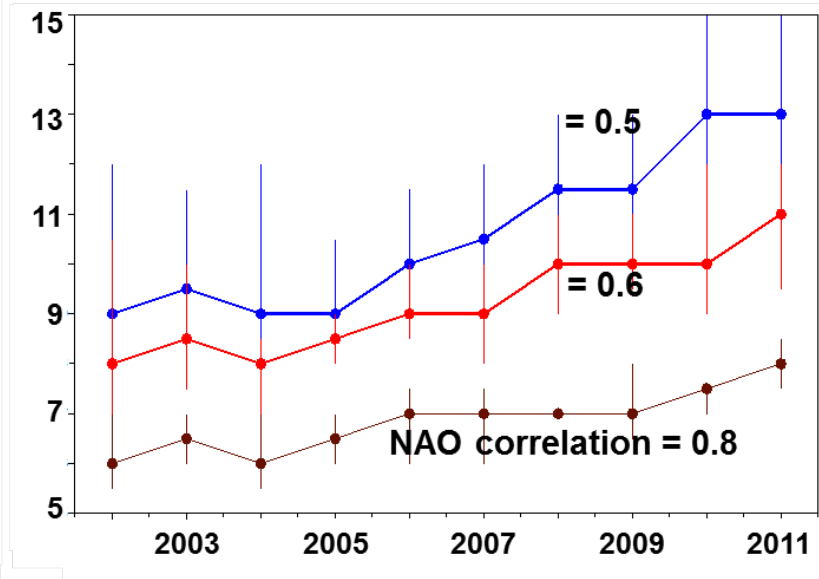
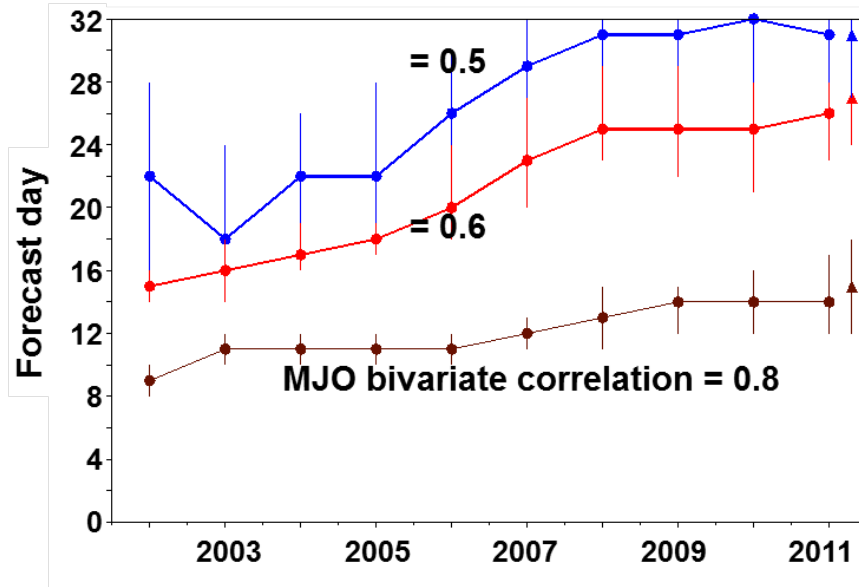
**Adrian Simmons
Consultant, ECMWF**

ECMWF has a continuing focus on a more seamless approach to its global prediction

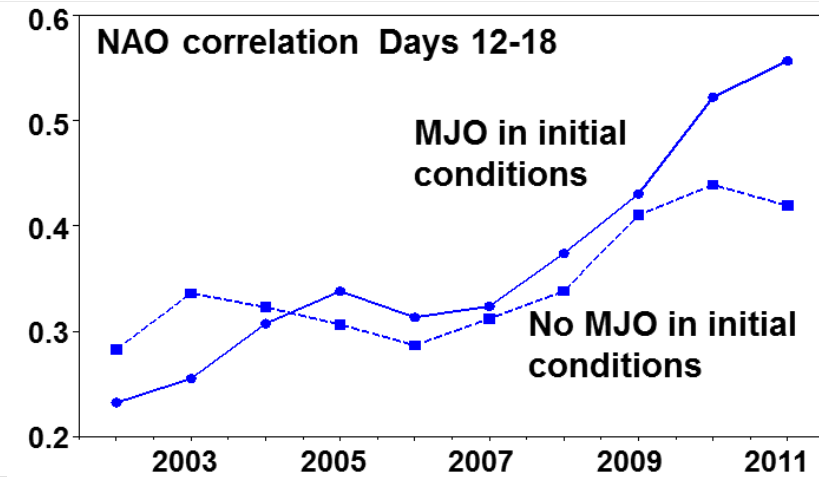
- has proposed “Predicting Weather and Climate Extremes” as a programme to replace THORPEX in 2014
- timescale of prediction would be out to one year
- link between WWRP and WCRP would be critical to the success of the programme
- THORPEX Data Assimilation and Observing Systems working group would continue and support the programme; a role for WGNE is also foreseen
- viewed as providing a key opportunity for addressing the modelling of events that have to be both forecasted and represented in models providing projections of climate
- addresses time range when growth of systematic model error may be largest and most susceptible to diagnosis, and where lessons may be learnt from models used in data assimilation

Improvements in MJO and NAO in monthly forecasts, and the link between the two

Skill of hindcasts for 1995-2001 produced by monthly forecasting system



From Vitart (2013)



Medium- and monthly-range systems will move towards

- use of coupled ocean model from day 0 (rather than day 10), with developmental emphasis on the resolution and mixed-layer representation of the ocean model
- incorporation of a sea-ice model from EC-Earth

Seasonal-range system will be further developed

- with blending of products with those from monthly-range forecasting, and investigation of capabilities of the two systems for drought forecasting and disease prevention
- but with the seasonal system still based on more intermittent updates
- to include the sea-ice model
- with continuing interaction with EC-Earth, and other developmental activities on snow-cover, vegetation, volcanic aerosol and stratospheric representation, predominantly through external project funding

Data assimilation work includes

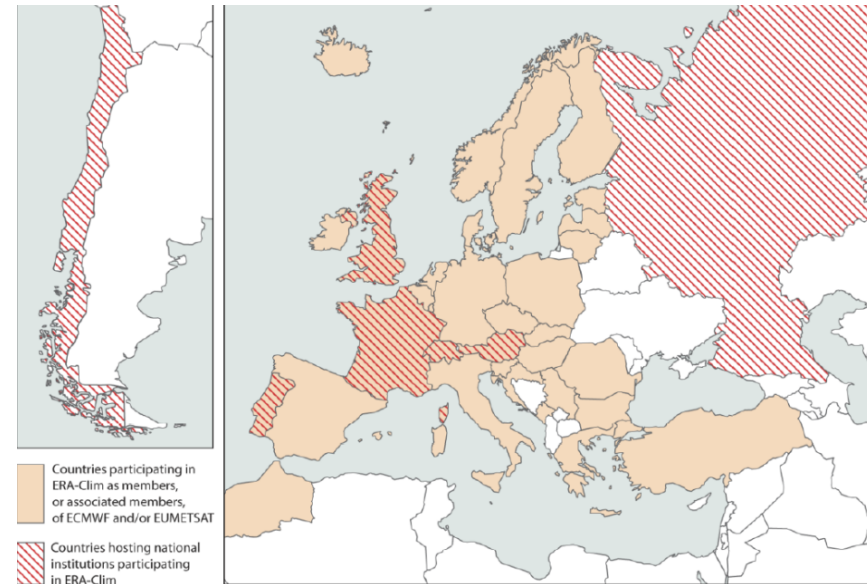
- move to longer time windows
- better, more dynamic representation of background and analysis uncertainty

ECMWF is active in development of EU Copernicus (aka GMES) services

- has coordinated development of core Atmosphere Service (GEMS/MACC) since 2005
- has led global reanalysis efforts in Europe for twenty years, with intermittent support from the European Union through FP3, FP5 and FP7 (and FP7 again)
- has involvement in other climate monitoring projects and core Marine Service project
- reanalysis is seen as an essential component of a proposed Climate Change Service
- operational budget for 2014-2020 awaits a decision of the European Parliament
- discussion is taking place with the European Commission on possible delegation arrangements for managing, and in part operating, services

ERA-CLIM: EU collaborative research project, 2011-2013, 9 partners

Goal: Preparing input observations, model data, and data assimilation systems for a global atmospheric reanalysis of the 20th century



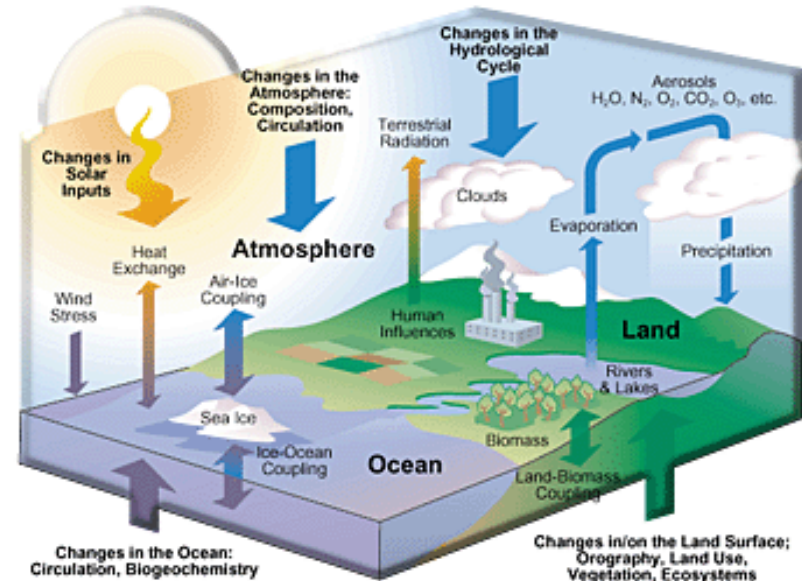
Main components:

1. Data rescue efforts (*in situ*, upper-air and satellite observations)
2. Incremental development of new reanalysis products
3. Use of reanalysis feedback to improve the data record
4. Access to reanalysis data and information on observation quality

ERA-20CM	Ensemble of model integrations, using HadISST2 and CMIP5 forcing	1900-2010 T159/L60 10 members	Complete
ERA-20C	Ensemble of reanalyses, using surface observations from ICOADS and ISPD	1900-2010 T159/L60 10 members	In progress, available end 2013
ERA-20C/Land	Global land surface, meteorological forcing from ERA-20C	1900-2010 T511 10 members	Available end 2013
ERA-SAT	New reanalysis of the satellite era (to replace ERA-Interim)	1979 onward T511/L91	Available 2015

Goal: Production of a consistent 20th-century reanalysis for major components of the earth system: *atmosphere, land surface, ocean, sea-ice, and the carbon cycle*

Building on: ERA-CLIM and parallel development of ocean and carbon-cycle reanalysis



Main components:

1. Production of coupled reanalyses CERA-20C and CERA-SAT
2. Research and development in coupled data assimilation
3. Earth system observations for extended climate reanalysis
4. Quantifying and reducing uncertainties

Ocean heat content from a 5-member reanalysis

