



WGNE activities and future directions

Andy Brown



Role of WGNE

- Working Group on Numerical Experimentation
 - Jointly established by the WCRP and the WMO Commission for Atmospheric Sciences (CAS)
 - Responsibility of fostering the development of atmospheric circulation models for use in weather prediction and climate studies on all time scales and diagnosing and resolving shortcomings.
- A distillation of the Terms of Reference.....
 - Advice, liaison
 - Co-ordinated experiments
 - Workshops, publications, meetings



Co-ordinated experiments and projects

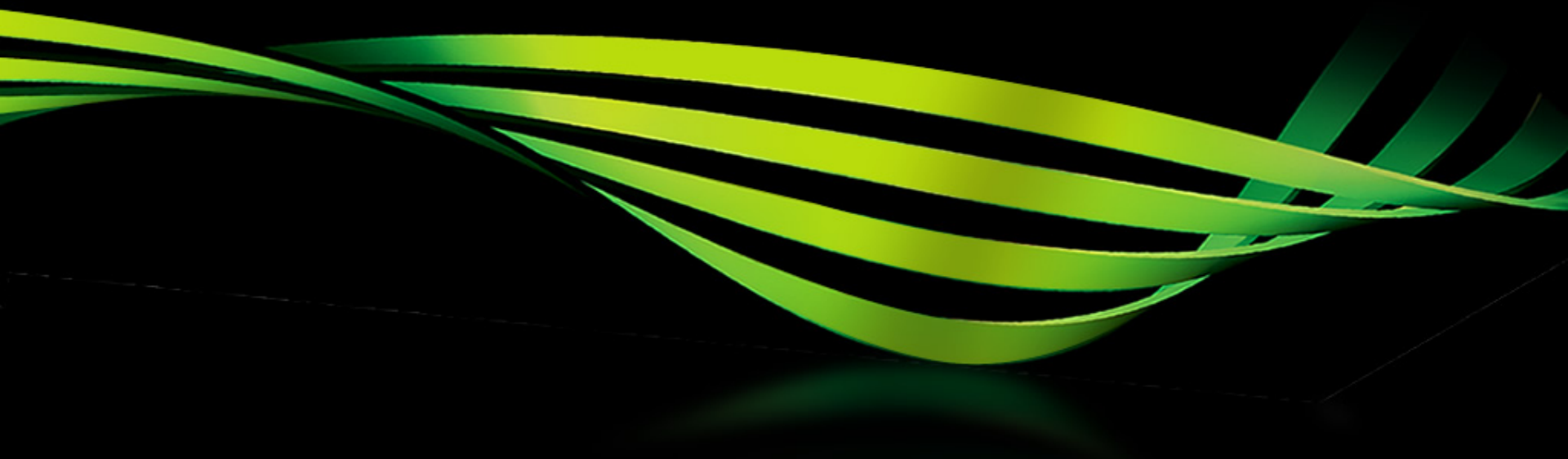


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- Transpose-AMIP **GOOD PROGRESS**
- Cloudy-radiance **DONE**
- Grey-zone **GOOD PROGRESS**
- Verification
 - NWP performance (eg TCs, precipitation) **ONGOING**
 - Polar (CBS-style; ConcordIASI intercomparison) **DONE** ➔ **PPP**
 - Climate metrics **GOOD PROGRESS**
 - Issues with verification against own analysis **NEW**
 - MJO / Boreal Summer Intraseasonal Oscillation intercomparisons (with MJO-TF) **ONGOING / NEW**
- Importance of aerosols for weather and climate **DISCUSSION WGNE 2012. PROJECT TO BE SPUN UP**
- Quality of monsoon simulations for weather and climate **DISCUSSION WGNE 2012**
- Comparison of model momentum budgets **NEW**



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Workshops and meetings



GOV/WGNE Ocean coupling workshop

- **Washington, USA. 19th-22nd March 2013**
- Follow on to ECMWF (2008) and Met Office (2009) workshops
- Focus on coupled modelling for short and medium range
- Use of short-range coupled to understand issues for longer range (e.g. subseasonal-seasonal)

GODAE OceanView Search:

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Location: Outreach / Meetings Workshops / Coupled Prediction Workshop Gov Wgne /

Joint GOV/WGNE workshop for coupled prediction

[Workshop home](#) | [Background](#)

Joint GODAE OceanView/WGNE workshop for coupled prediction

Status, needs and challenges in Short- to Medium-Range Coupled Prediction of the Earth System

Where:	Washington DC /TBC, USA
When:	19-22 March 2013
Duration:	4 Days (Tues - Fri)
Organisers:	Dr Bill Lapenta, EMC/NCEP/NWS/NOAA, U.S. Dept. Of Commerce, WGNE representative Dr Gary Brassington, CAWCR, Bureau of Meteorology, GOV representative, JCOMM ET-OOFS chair Dr. Glenn White, EMC/NCEP/NWS/NOAA, U.S. Dept. Of Commerce

Workshop objectives

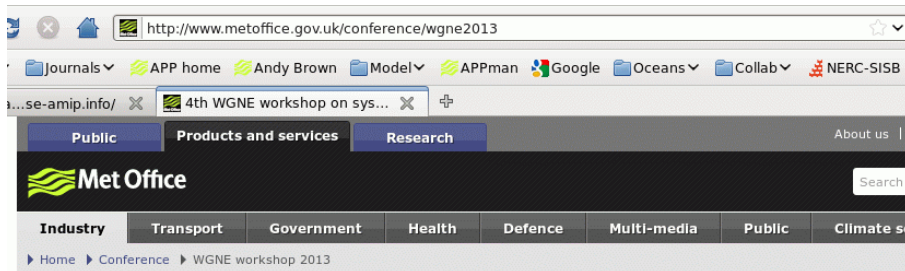
1. Conduct a workshop to invite members of the WGNE and GODAE OceanView community with interests in developing coupled high resolution earth systems for short- to medium- range prediction
2. Present the latest evidence of the impact of coupled modelling on the earth system analysis and forecasts
3. Present the latest progress in the development and identify gaps in knowledge and leading scientific questions to be addressed for:
 - a. coupled earth system observations
 - b. coupled earth system physical parameterisation
 - c. coupled earth system dynamical modelling
 - d. coupled earth system data assimilation
4. Discuss the requirements and opportunities for collaboration between each area
5. Discuss the formation of a joint group (Why/How/Who/When/Where)
6. Report on progress, gaps and challenges in the field and specific actions/recommendations for further progress

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<https://www.godae-oceanview.org/outreach/meetings-workshops/task-team-meetings/coupled-prediction-workshop-gov-wgne-2013/>

4th WGNE Workshop on Systematic Errors in Weather and Climate Models



4th WGNE workshop on systematic errors in weather and climate models

The JSC/CAS Working Group on Numerical Experimentation (WGNE) is organising a workshop on systematic errors in weather and climate models to be hosted at the Met Office, Exeter, UK, during 15-19 April 2013.

The principal goal will be to increase understanding of the nature and cause of errors in models used for weather and climate prediction (including intra-seasonal to inter-annual). It is anticipated that, the focus will be on General Circulation Models (GCMs) such as those used in [CMIP5](#), [TIGGE](#), etc., including atmosphere-only, coupled atmosphere-ocean and earth system models. Biases in the atmosphere, land surface, ocean and cryosphere are all of interest. A wide variety of diagnostic techniques will be discussed, including traditional analysis methods applied to global models, process studies, the use of diagnostic and process models (e.g., single-column, cloud-resolving), and simplified experiments (e.g., aqua-planet). Of special interest will be studies that consider errors found in multiple models and errors which are present across timescales. Diagnostics and metrics that utilize novel or multi-variate observational resources and constraints to identify and characterize systematic errors are welcomed, together with studies which infer the amount of systematic error in predicted extremes from systematic errors in non-extreme situations.



Globe graphic

Alongside [WGNE](#), the following groups will contribute to the coordination of the workshop: The Working Group on Coupled Models ([WGCM](#)), the Working Group on Seasonal to Inter-annual Prediction ([WGSIP](#)), the Working Group on Ocean Model Development ([WGOMD](#)), Stratospheric Processes And their Role in Climate ([SPARC](#)), Global Energy and Water Cycle Experiment ([GEWEX](#)), and the Year Of Tropical Convection ([YOTC](#)) project.

More details will appear here as planning progresses.

Systematic errors workshop scientific steering committee:

- Keith Williams (chair and local organiser)
- Christian Jakob and Andy Brown (WGNE co-chairs)
- Sandrine Bony (representing WGCM)
- Adam Scaife (representing WGSIP and SPARC)
- Gokhan Danabasoglu (representing WGOMD)
- Peter Gleckler (representing Climate Metrics Panel)
- Beth Ebert (representing Joint Working Group on Verification)
- Jon Petch (representing GEWEX)
- Duane Waliser (representing the observational community and YOTC)

Questions can be addressed to [Keith Williams](#).

- Met Office, Exeter, UK. 15th-19th April 2013
- Weather and climate
- Nature and causes of errors
- Use of diagnostic techniques, observations, process models and simplified experiments to understand errors

<http://www.metoffice.gov.uk/conference/wgne2013>

WGNE systematic errors meeting

Key recommendations

- The workshop recommends putting **more emphasis on seamless approaches to model evaluation** and improvement across the existing programmes of WMO. **A close collaboration of the WCRP and WWRP** in this area is strongly recommended. The WGNE should play a major role in facilitating this approach for the atmospheric modelling community and similar efforts for other model components are desirable.
- The **lack of and/or inaccessibility to some key observations** remains a major challenge. These include surface fluxes (especially over the oceans), and observations in polar and tropical regions. Additional efforts in these areas are required.

WGNE systematic errors meeting

Key recommendations

- The workshop encourages a **wider range of diagnostic techniques** to be applied to model errors. In particular, these should be applied on the timescale on which errors develop. This needs to be supported by **well organised data (model and observational) available in common formats across timescales**. The workshop notes the vital role played by those hosting data for these activities.
- The **links across the communities currently divided by timescales (e.g., climate – seasonal - weather) need further strengthening**. It is recommended that **workshops** targeted at addressing these connections specifically should be organized in the near and medium term.

WGNE systematic errors meeting

Key recommendations

- The workshop encourages the development of **diagnostic methods that are specifically aimed at linking dynamical and physical processes** in models. A **special workshop** in this area might be helpful to organize the community.
- Most operational centres tend to have a mid-latitude focus to their work. As a consequence, the **quality of their tropical and polar analyses** has been found to be lower than that in the mid-latitudes. This also applies to re-analyses. The workshop recommends **additional efforts** in the development of data assimilation systems in those regions. The **WGNE** should lead an effort to assess the quality of the systems and propose future activities.

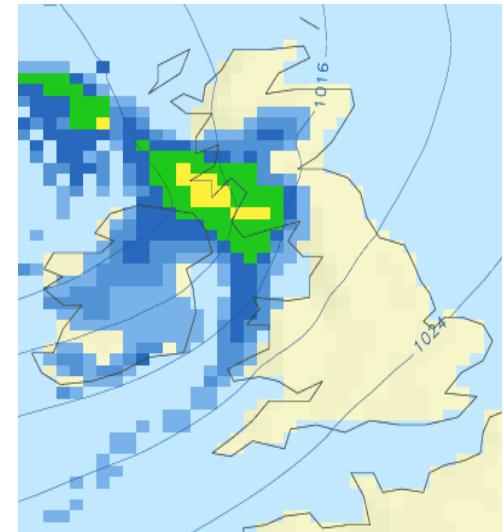
WGNE systematic errors meeting

Key recommendations

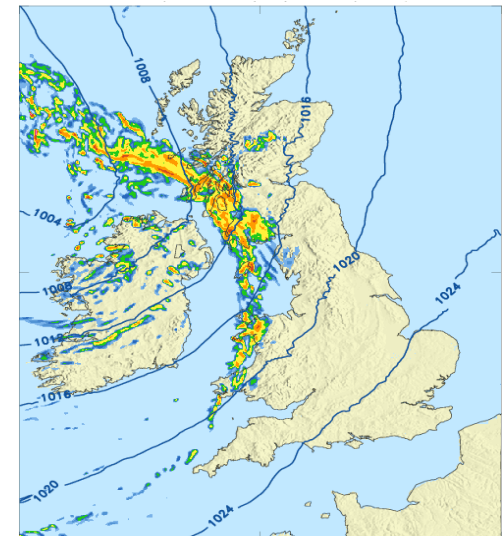
- The workshop recommends for the WCRP and WWRP to develop a joint initiative for a repository for diagnostic packages. This could be an area for development under the auspices of the WGNE/WGCM Metrics Panel.
- An impediment to progress that the workshop has identified is that different model configurations are often submitted to different model intercomparison projects (MIPs) and process studies. This makes community efforts to diagnose common model errors and their sources difficult. All modelling projects in WCRP and WWRP should be asked to develop a strategy around this issue. -> WMAC???

Future directions

- Short-range weather prediction
 - Changing focus – cloud, rain, surface temperature (not Z500!)
 - Increased emphasis on high resolution – especially convection permitting
 - Grey-zone project
 - Appropriate metrics for high resolution models (with JWGV) [and routine use of them](#)
 - [Link to climate downscaling?](#)



25km

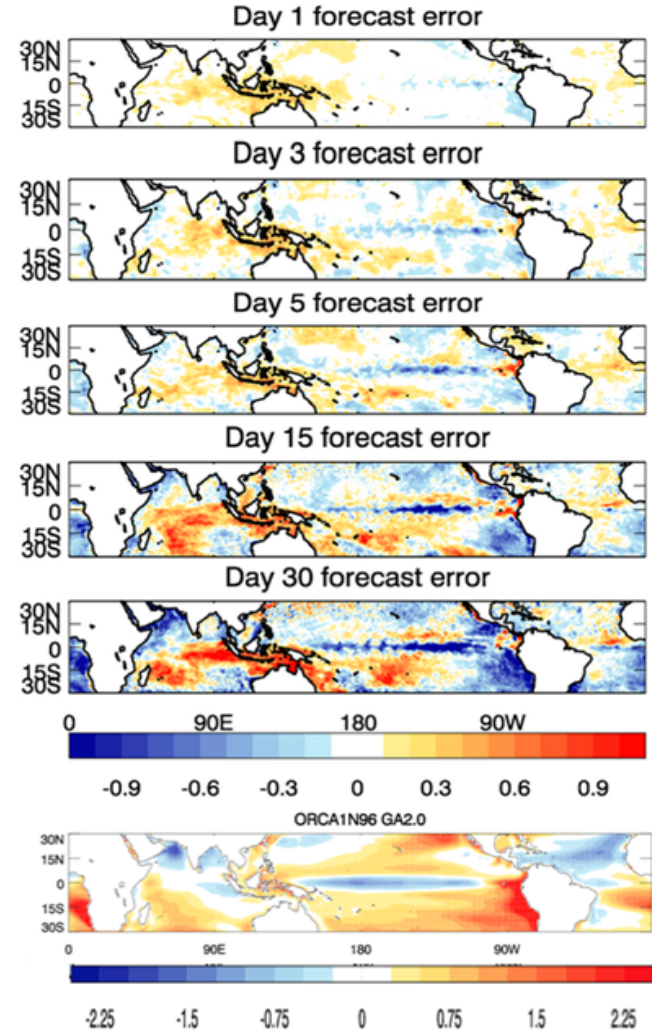


1.5km

Future directions

Time evolution of coupled model SST errors

- Earth system prediction
 - Weather models coupled to ocean, composition, air quality, hydrology, ice.....
 - Bringing together communities (GODAE coupling workshop; systematic errors meeting)
 - Importance of aerosol for NWP: review [and test cases](#)
 - [TRANSPOSE-CMIP?](#)





Future directions

- “Traditional model evaluation development”
 - Still important – and importance under-recognized
 - Champion (with partners) e.g. Conferences
 - Specific projects to engage community and tackle key issues
 - Boreal ISV
 - Grey zone
 - Drag
 - Dynamical cores (Workshops, Review of Centre Plans, [Next steps?](#))
 - [Stratosphere \(resolution, QBO\)?](#)
 - [Stochastic Physics?](#)



Future directions

- Continue to look cross-timescale – weather and climate (and air quality/chemistry) communities together
- Need to keep championing the importance of model development
- Maintain strong links to many other groups and projects e.g. WWRP, DAOS, GASS, polar, subseasonal-seasonal, WGCM, SPARC, WMAC, GODAE, WCRP Grand Challenges.....
- Open questions and challenges
 - Involvement in data assimilation; relation to mesoscale working group
 - Maintaining active portfolio of projects and workshops/conferences



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Questions?

Project sessions this week
Stable boundary layers
The diagnosis of cloud and radiation processes in models
Weak temperature gradient
Grey-zone project
Microphysics modelling (KiD)
LoCo/SGP Testbed (GLASS project)
Marine Boundary Layer Cloud Feedbacks (CGILS)
Land-Atmosphere Interactions (GLASS/GABLS joint project)
Radiative Processes in Observations and Models
Cirrus
Tropical Convection observed during CINDY/DYNAMO
Polar Clouds (ISDAC)
Stratocumulus-to-trade cumulus transition
Vertical structure and diabatic heating of the MJO

