



# WGNE activities and future directions

Andy Brown and Jean-Noel Thepaut presented by Christian Jakob

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- 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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## **Coordinated Projects**

### Met Office

- Transpose-AMIP GOOD PROGRESS
- Cloudy-radiance DONE
- Grey-zone GOOD PROGRESS
- Verification
  - NWP performance (eg TCs, precipitation) ONGOING
  - Polar (CBS-style; ConcordIASI intercomparsion) 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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The Transpose-AMIP II experiment and its application to the understanding of Southern Ocean

cloud biases in climate models

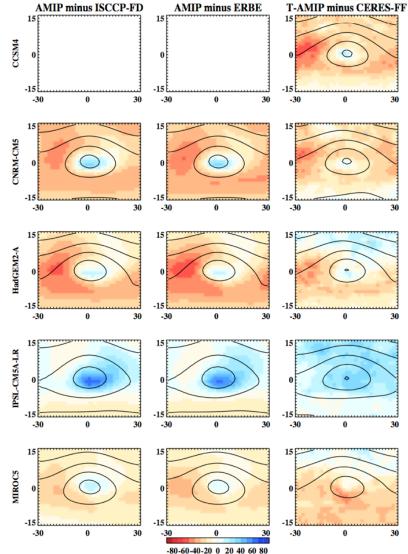
K.D. Williams\*1, A. Bodas-Salcedo<br/>1, M. Déqué²,

S. Fermepin<sup>3</sup>, B. Medeiros<sup>4</sup>, M. Watanabe<sup>5</sup>,

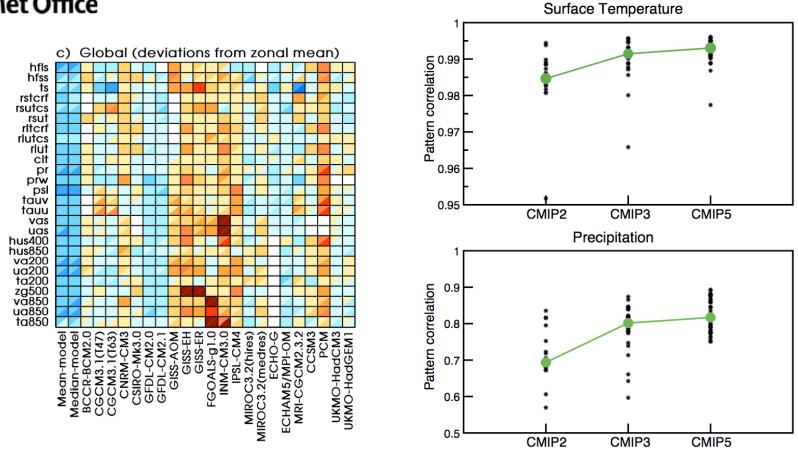
C. Jakob<sup>6</sup>, S.A. Klein<sup>7</sup>, C.A. Senior<sup>1</sup> and D.L. Williamson<sup>4</sup>

#### Journal of Climate, 2013

#### Shortwave error composite







After early resistance now broad community acceptance! Watch the next IPCC report!



## Workshops and meetings

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### GOV/WGNE Ocean coupling workshop

tion: Outreach / Meetir	ngs Workshops / Co	Coupled Prediction Workshop Gov Wgne /
	Joint GO	DV/WGNE workshop for coupled prediction
ttings & workshops DVST III meeting DVST II meeting DVST I meeting DDAE OceanView -		Workshop home   Bac DAE OceanView/WGNE workshop for coupled prediction and challenges in Short- to Medium-Range Coupled Prediction of the Earth System
GSOP- CLIVAR workshop COSS-TT workshop MEP-TT Workshop Joint GOV/WGNE workshop for coupled	Where:	Washingtin DC /TBC, USA
	When:	19-22 March 2013
	Duration:	4 Days (Tues - Fri)
diction ackground and otivations	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
	resolution 2. Present th 3. Present th a. coup b. coup c. coup d. coup 4. Discuss th	ODECIVES a workshop to invite members of the WGNE and GODAE OceanView community with interests in developing coupled n earth systems for short- to medium-range prediction the latest evidence of the impact of coupled modelling on the earth system analysis and forecasts the latest progress in the development and identify gaps in knowledge and leading scientific questions to be addresse upled earth system observations upled earth system dynamical modelling upled earth system dynamical modelling upled earth system dynamical modelling upled earth system data assimilation the requirements and opportunities for collaboration between each area the formation of a joint group (Why/How/Who/When/Where)

### • 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)



# 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 <u>CMIP5 & TIGGE &</u>, 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.

Alongside <u>WGNE</u> 67, the following groups will contribute to the coordination of the workshop: The Working Group on Coupled Models ( <u>WGCMD</u> 67), the Working Group on Seasonal to Inter-annual Prediction (<u>WGSIP</u> 67), the Working Group on Ocean Model Development ( <u>WGOMD</u> 67), Stratospheric Processes And their Role in Climate (<u>SPARC</u> 67), Global Energy and Water Cycle Experiment (<u>GEWEX</u> 67), and the Year Of Tropical Convection (<u>YOTE</u> 67) 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)
- Goknan Danabasogiu (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)

Ouestions can be addressed to Keith Williams

#### Globe graphic

## 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

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## WGNE systematic errors meeting Key recommendations

- Put more emphasis on seamless approaches to model evaluation
- More efforts for key observations (fluxes, poles, tropics)
- Increase range of diagnostics applied to models -> requires well organized and accessible datasets
- Strengthen links between weather and climate communities -> Joint workshops
- Special workshops on diagnosis dynamics-physics interactions and their role in model error

## WGNE systematic errors meeting Key recommendations

- Special efforts to improve analyses in the tropics and polar regions
- Joint WWRP/WCRP initiative for a repository of diagnostic codes -> Metrics Panel?
- Harmonization of experiments beyond CMIP -> remove inconsistencies in model versions wherever possible



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## WGNE and the Grand Met Office Challenges

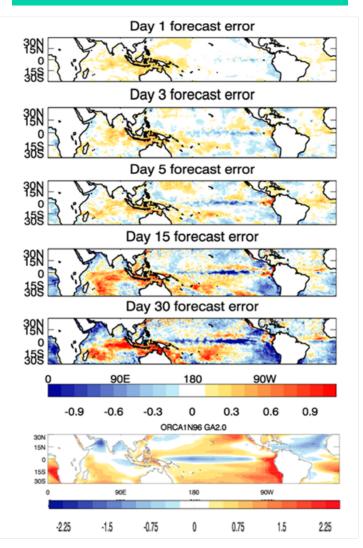
- Many of the GCs require the "weather" in climate models to be correct
- WGNE has much experience, a community and ongoing activities to analyze the weather in models
- Engagement with WGNE can occur through the T AMIP effort and through the diagnosis of model error on shorter time scales
- WGNE also connects directly to modeling centres in which model development occurs -> Key to the model development needed in literally all GCs



Earth system prediction

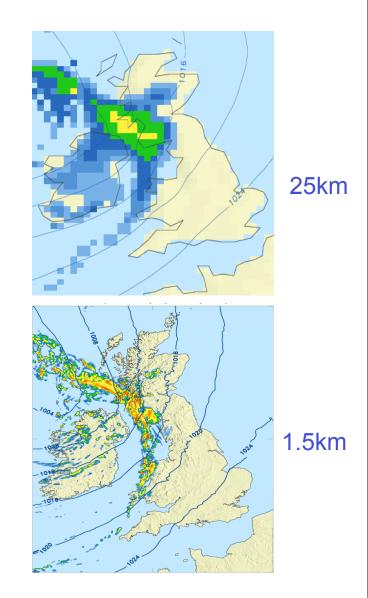
- Weather models coupled to ocean, composition, air quality, hydrology, ice.....
  - Bringing together communities (GODAE coupling workshop; systematic errors meeting)
  - Importance of aerosol for NWP: review and test cases
  - TRANSPOSE-CMIP?

## Time evolution of coupled model SST errors





- 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 JWGVR) and routine use of them
    - Link to climate downscaling?





- "Traditional model development"
  - Still important and importance underrecognized
  - 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?

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- 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
  - Maintaining active portfolio of projects and workshops/ conferences
  - Involvement in Grand Challenges
  - Actively crossing the weather-climate divide



## Questions?

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