

WGNE Workshop on Systematic Errors in Weather and Climate Models
15-19 April 2013, Exeter, United Kingdom

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The Working Group on Numerical Experimentation (WGNE), jointly sponsored by the Joint Scientific Committee of the World Climate Research Programme and the Commission of Atmospheric Sciences of the World Climate Research Programme, organized a workshop on Systematic Errors in Weather and Climate Models, hosted at the Met Office, Exeter, UK, during 15-19 April 2013. More than 270 people from around the world attended the meeting.

The principal goal was to increase understanding of the nature and cause of errors in models used for weather and climate prediction (including intra-seasonal to inter-annual). The focus was on General Circulation Models (GCMs) such as those used in CMIP5, TIGGE, operational NWP, etc., including atmosphere-only, coupled atmosphere-ocean and earth system models. Biases in the atmosphere, land surface, ocean and cryosphere were all of interest. A wide variety of diagnostic techniques were 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 were studies that consider errors found in multiple models and errors that are present across timescales. Diagnostics and metrics that utilize novel or multivariate observational resources and constraints to identify and characterize systematic errors were welcomed, together with studies which infer the amount of systematic error in predicted extremes from systematic errors in non-extreme situations.

The workshop closed with a number of outcomes and recommendations. It was recognized that the identification of systematic errors in climate predictions and weather forecasts are challenged by the lack and inaccessibility of observations and their inherent uncertainties, for example regarding surface fluxes in light of developments of coupled predictions and

associated data assimilation efforts, and polar data for example on clouds, sea-ice volume, etc. A wide range of innovative diagnostic techniques is now available to identify the timescales on which errors develop and provide the basis for supporting new potential initiatives such as a climate-equivalent Transpose-CMIP effort in the future. These types of endeavours require efficient coordination between the various climate and weather communities and need to consider both physical and dynamical aspects of the problem. Reanalysis play an important role in identifying systematic errors in models and may greatly benefit from further improvements in the tropics and Polar Regions. Some error-diagnostic activities could be facilitated by developing standard packages being made available through a central repository. The implications of various model configuration for intercomparison efforts remains critical to develop research conclusions (e.g. for CMIP6) and provide feedback to the operational centres.

Alongside WGNE, the following groups contributed 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), the Joint Working Group on Forecast Verification Research (JWGFVR), and the Year Of Tropical Convection (YOTC) project.

Further details can be found at

http://www.metoffice.gov.uk/media/pdf/h/9/WGNE_Workshop_Summary_v1p0.pdf.