Systematic Errors Discussion

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WGNE30

Conclusions of WGNE Sys. Err. Workshop

15-19 April 2013, Met Office

- “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.”

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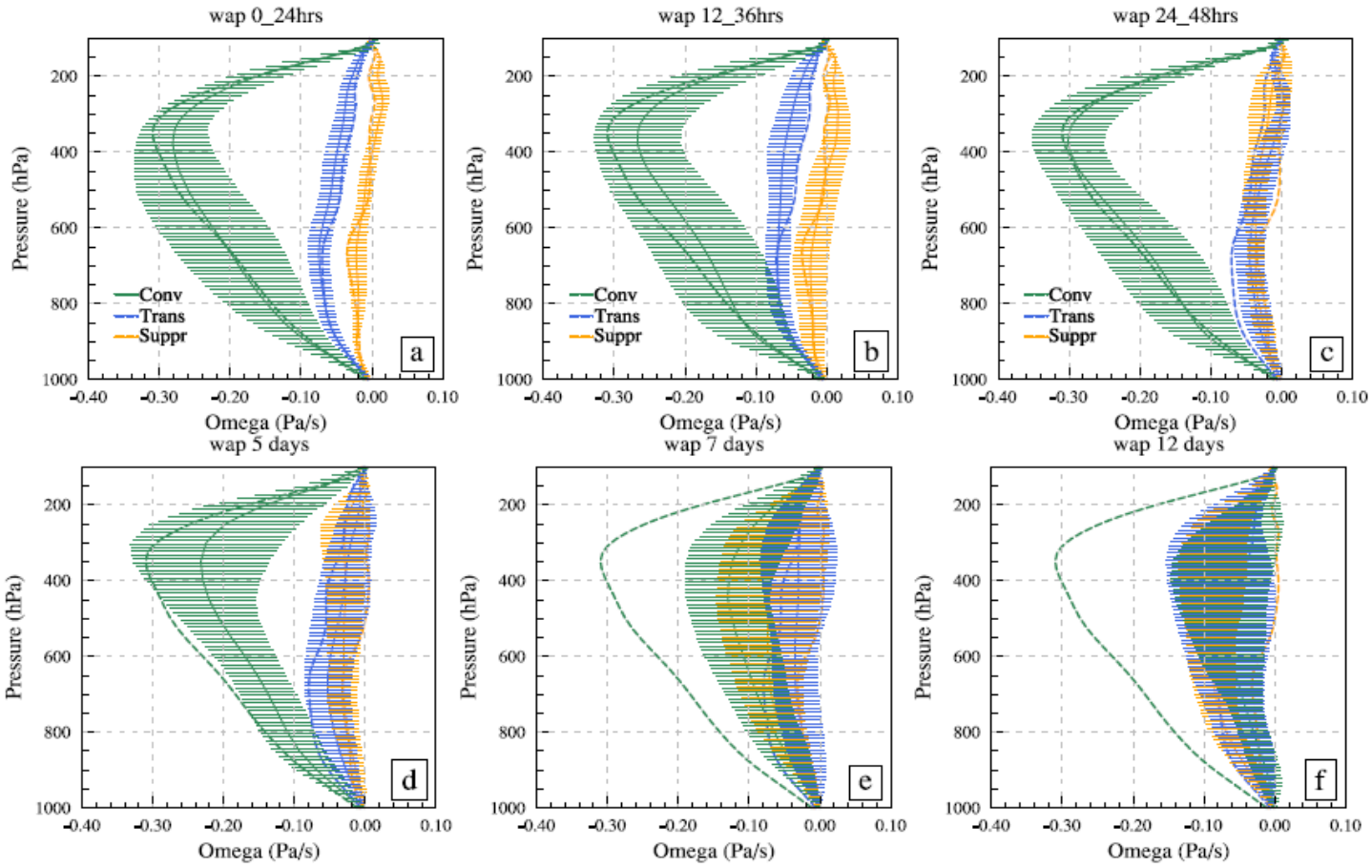
- The lack of and/or inaccessibility to some key observations remains a major challenge. These include surface fluxes (especially over the oceans), and observations in polar and tropical regions. Additional efforts in these areas are required.
- The workshop encourages a wider range of diagnostic techniques 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.
- 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.
- 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.

Examples – tropics (MJO)

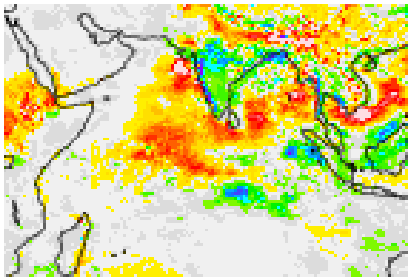


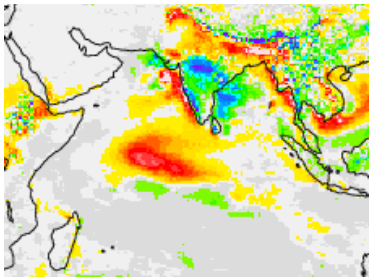
A lot of coordinated work going on in MJO-TF

Xavier et al. (2015, submitted to JGR)

Examples – tropics (S. Asia / MC / Warm pool)

T+120 UM minus TRMM

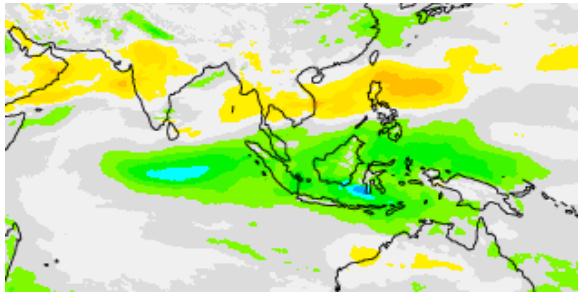




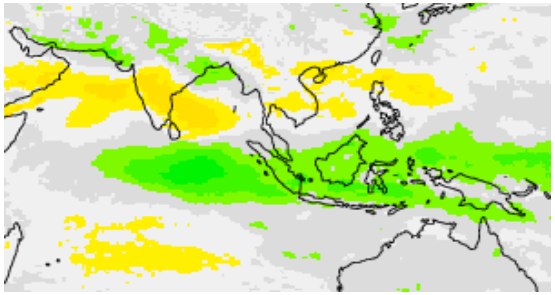
T+120 UM minus EC

T+120 U850 bias against analyses

UM

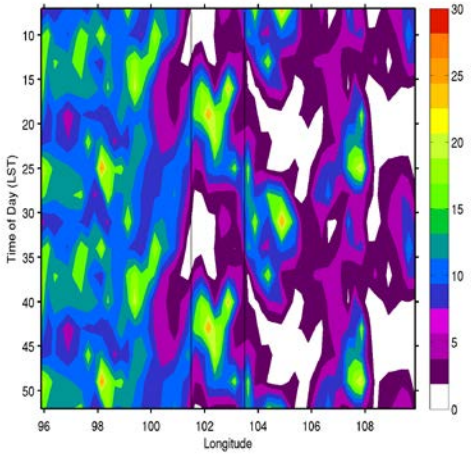


EC

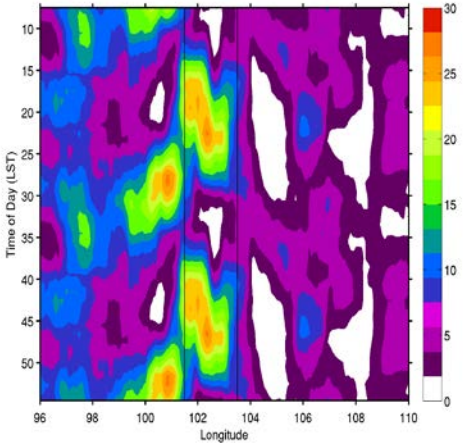


Use of convective permitting models

TRMM



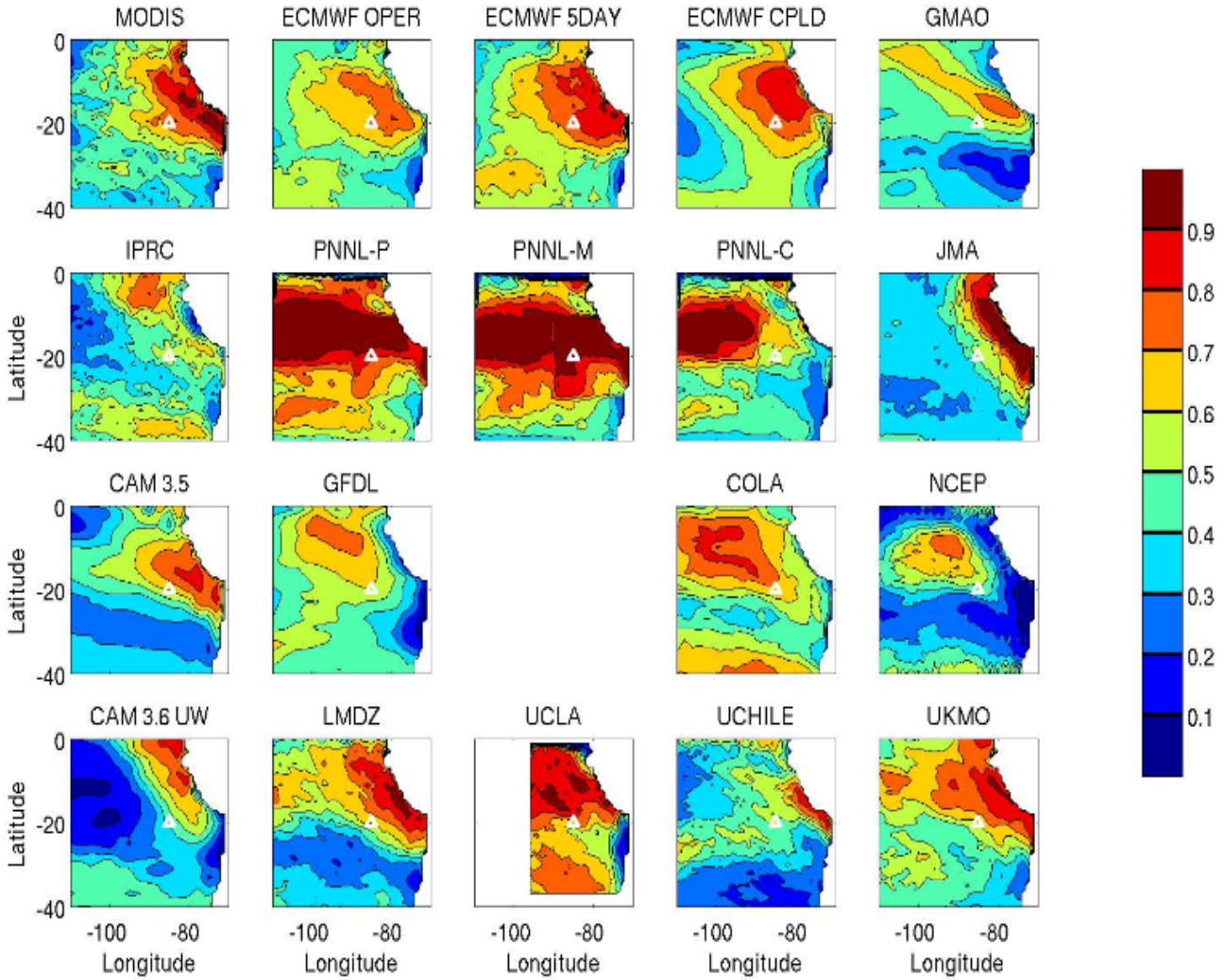
2.2km UM



Lots of work going on (see WGNE workshop). Does there need to be coordination? Could this be around forthcoming field campaigns (e.g. YMC)?

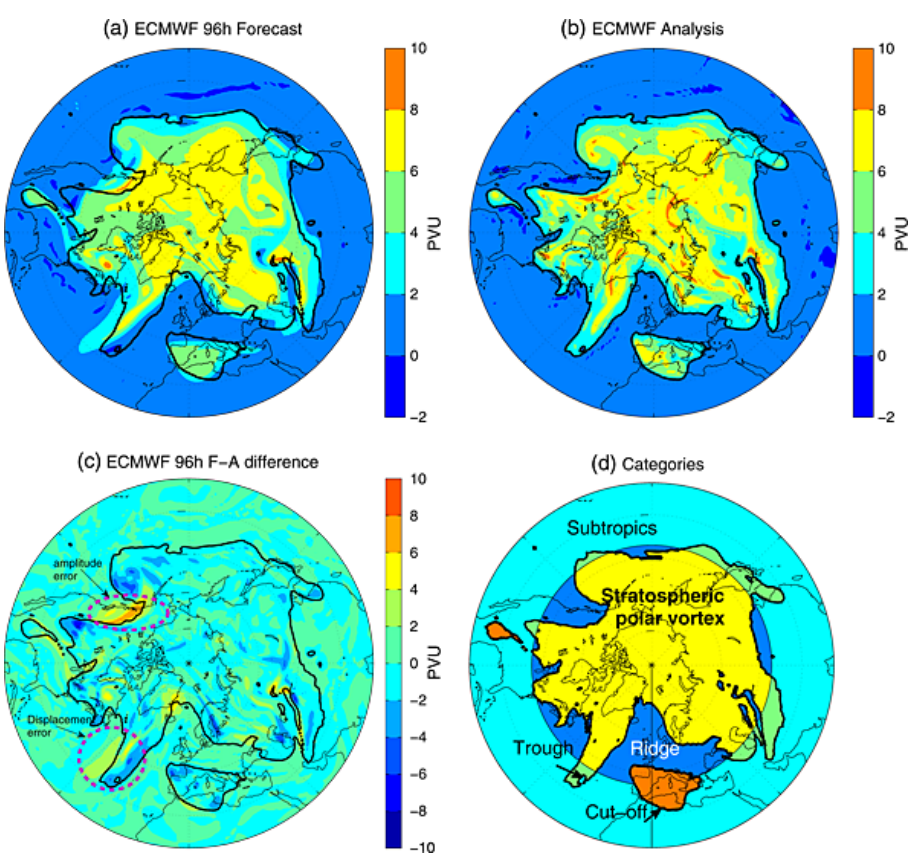
Examples – tropics (sub-tropical stratocumulus)

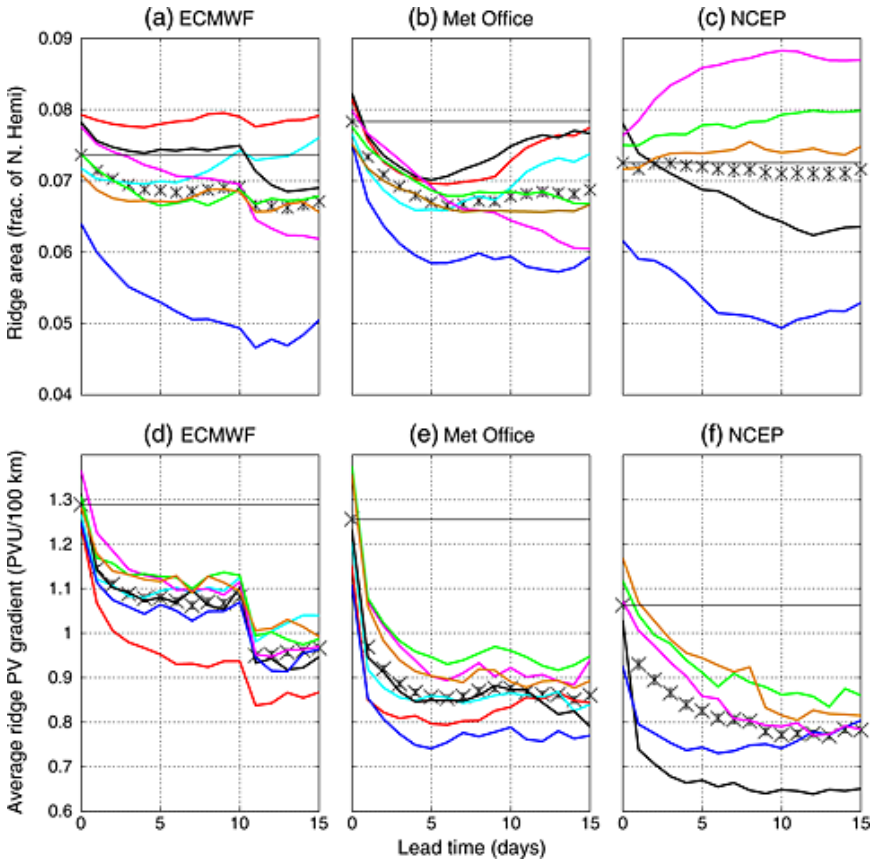
Are VOCALS data being exploited enough? Are more coordinated modelling activities needed?



Wyant et al. (2010)

Examples – mid-latitudes (Dynamical ridge building)

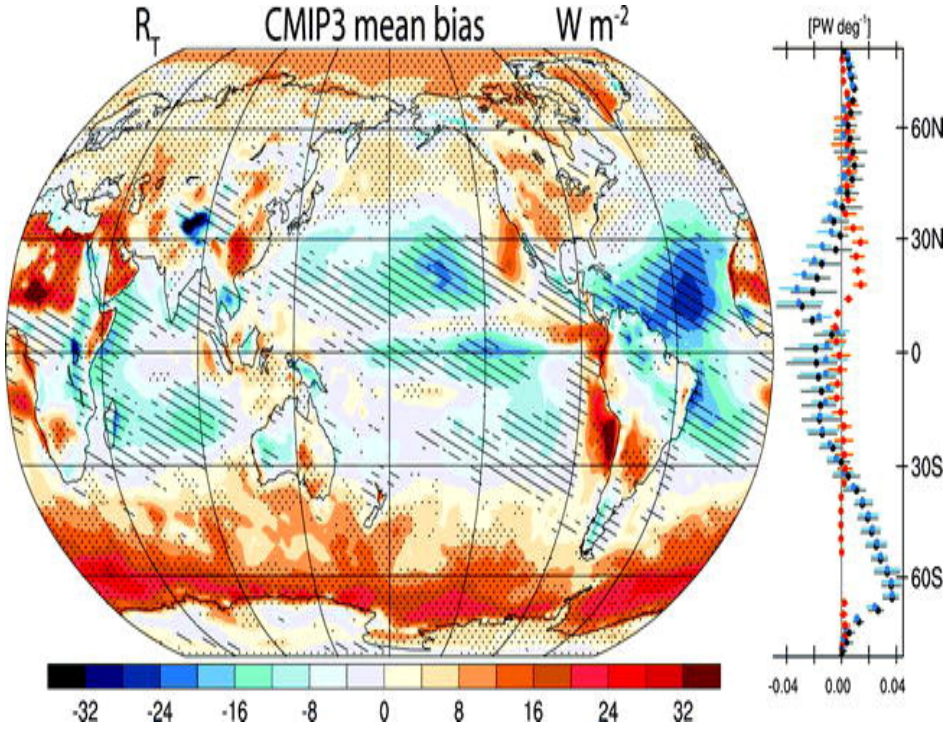




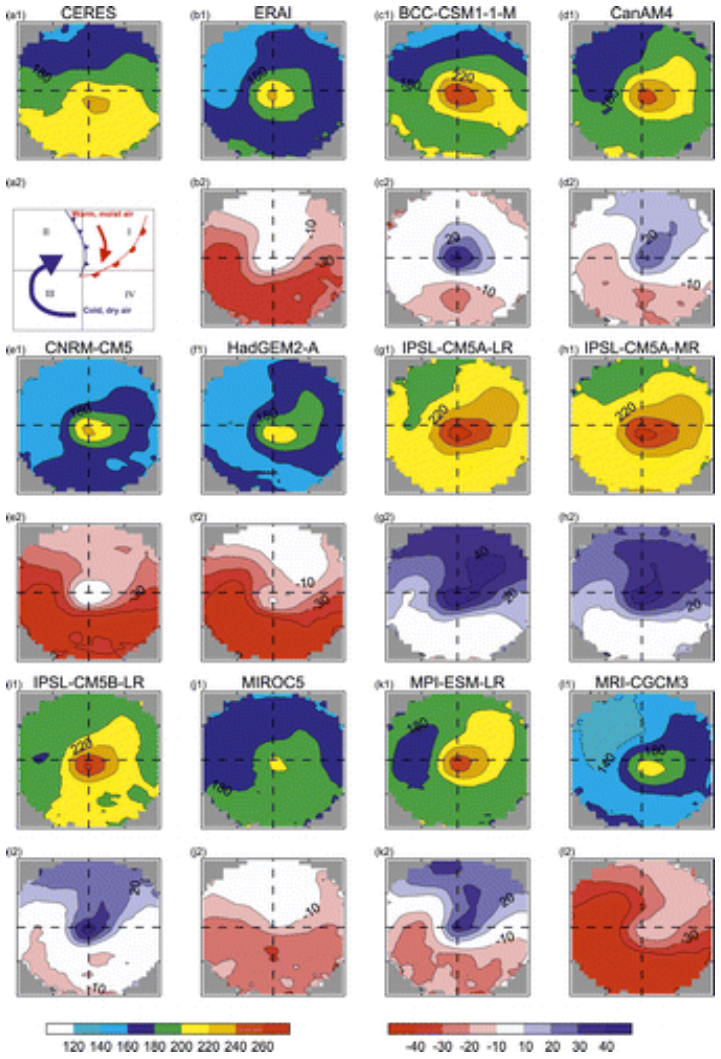
Gray et al. (2014, GRL)

Coordinate modelling work around NORDEX?
Opportunity for NWP & climate centres to contribute

Examples – mid-latitudes (Southern Ocean surface fluxes)



Trenberth and Fasullo (2010)

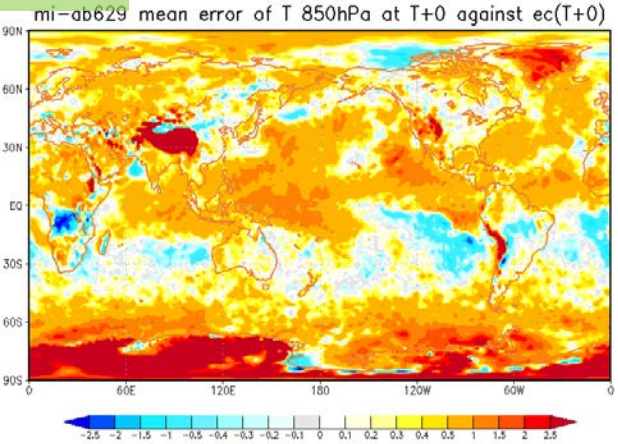


Bodas-Salcedo et al. (2014)

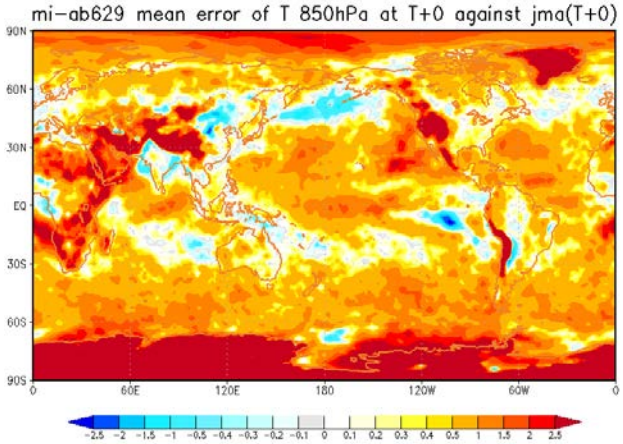
A lot of work going on. Focus work around SOCRATES?

Examples – Analyses
(T850 MO analysis against other centres)

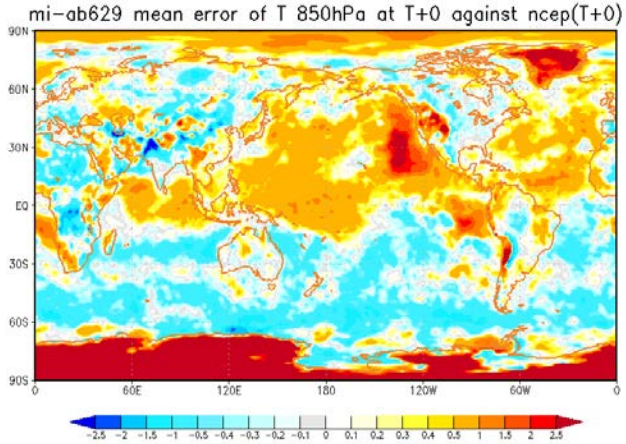
Cntl



vs ECMWF

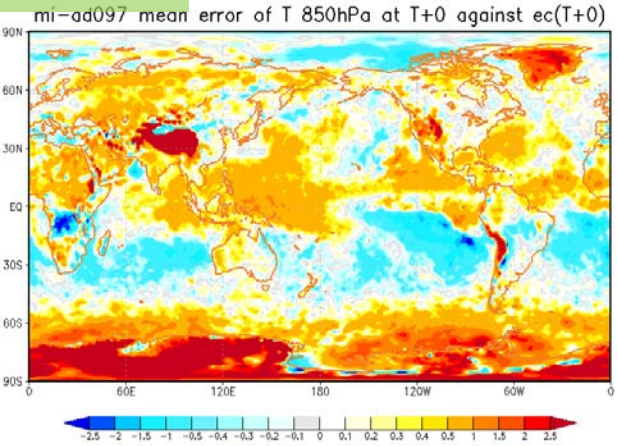


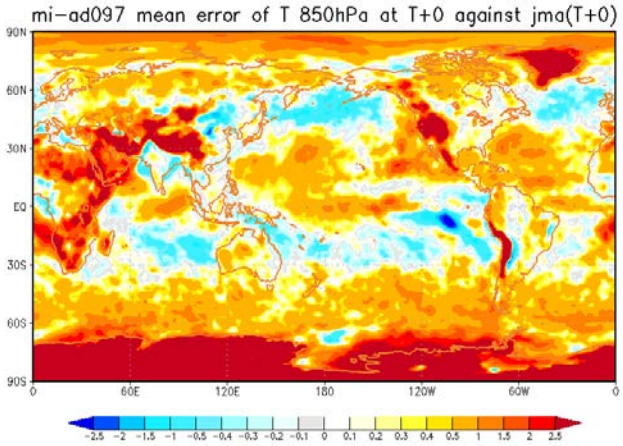
vs JMA

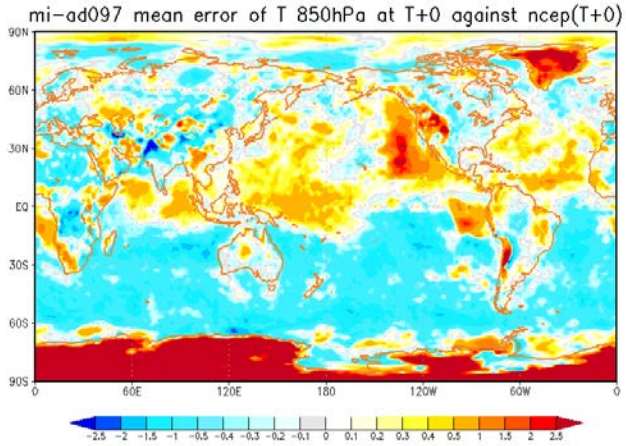


vs NCEP

VarBC







Masashi Ugiie (visiting from JMA)

Needs coordinated work?

My thoughts

- A lot of diagnostic work into systematic errors is going on.
- Do some aspects need more coordination? Could future field campaigns offer a focus in some cases?
- Benefits of looking across timescales is clear. A number of studies are doing this for 1 model, however differing model configurations/file formats/diagnostic lists prevent inter-MIP comparison.

Do we need so many databases?

Database	Purpose	File format
TIGGE	Medium range, near-real time forecasts	GRIB
S2S	Sub-seasonal, near-real time forecasts	GRIB
WMOLC	Seasonal real time forecasts	GRIB
CHFP	Seasonal hindcasts	CF-netCDF
Decadal fc exchange	Decadal forecasts	CF-netCDF
ESGF	Climate change, decadal hindcasts, idealised simulations for model understanding	CF-netCDF

- Diagnostic lists vary between all
- Submitted model configurations often differ

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