



# Transpose-AMIP update

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WGCM17



# What is Transpose-AMIP?

- Basically, running climate models in NWP mode.
- Core expt for Transpose-AMIP II is to run 64 hindcasts, each 5 days long, initialised from ECMWF YOTC analysis.
- Optional expt to repeat the same set of hindcasts with NASA MERRA re-analysis or own analysis.
- The hindcasts are spread through the annual and diurnal cycles during 2008/9 and were chosen to tie in with YOTC and coincide with some of the IOPs in:
  - VOCALS (SE Pacific stratocumulus)
  - AMY (Asian monsoon)
  - T-PARC (mid-latitude Pacific)
- Any global modelling centre (NWP or climate) can submit data. Those taking part in CMIP5 should use the same model as is being used for their AMIP simulation.
- **Jointly endorsed by WGNE and WGCM.**

[www.transpose-amip.info](http://www.transpose-amip.info)



Met Office

# Status of experiments:

	Expt pledged	Expt run	Data converted	Data on ESG
EC-Earth (2.3) (Frank Selton)	✓	✓	In progress	
EC-Earth (36r4) (Martin Evaldsson)	✓	✓	In progress	
GFDL (Leo Donnor/student)	✓			
IPSL (Sandrine Bony/Solange Fermepin)	✓	✓	✓	✓
Met Office (Keith Williams)	✓	✓	✓	✓
Meteo France (Michel Deque)	✓	✓	✓	✓
MIROC (Masahiro Watanabe)	✓	✓	✓	✓
MPI (Traute Crueger)	✓	✓	In progress	
MRI (Tomoaki Ose)	✓			
NCAR (Brian Medeiros)	✓	✓	✓	On NCAR node



# Transpose-AMIP II Papers

T-AMIP II  
description  
paper  
(shown at  
last WGCM)



- Williams et al. (2013) The Transpose-AMIP II experiment and its application to the understanding of Southern Ocean cloud biases in climate models *J. Climate*, doi:10.1007/s00382-012-1555-1.

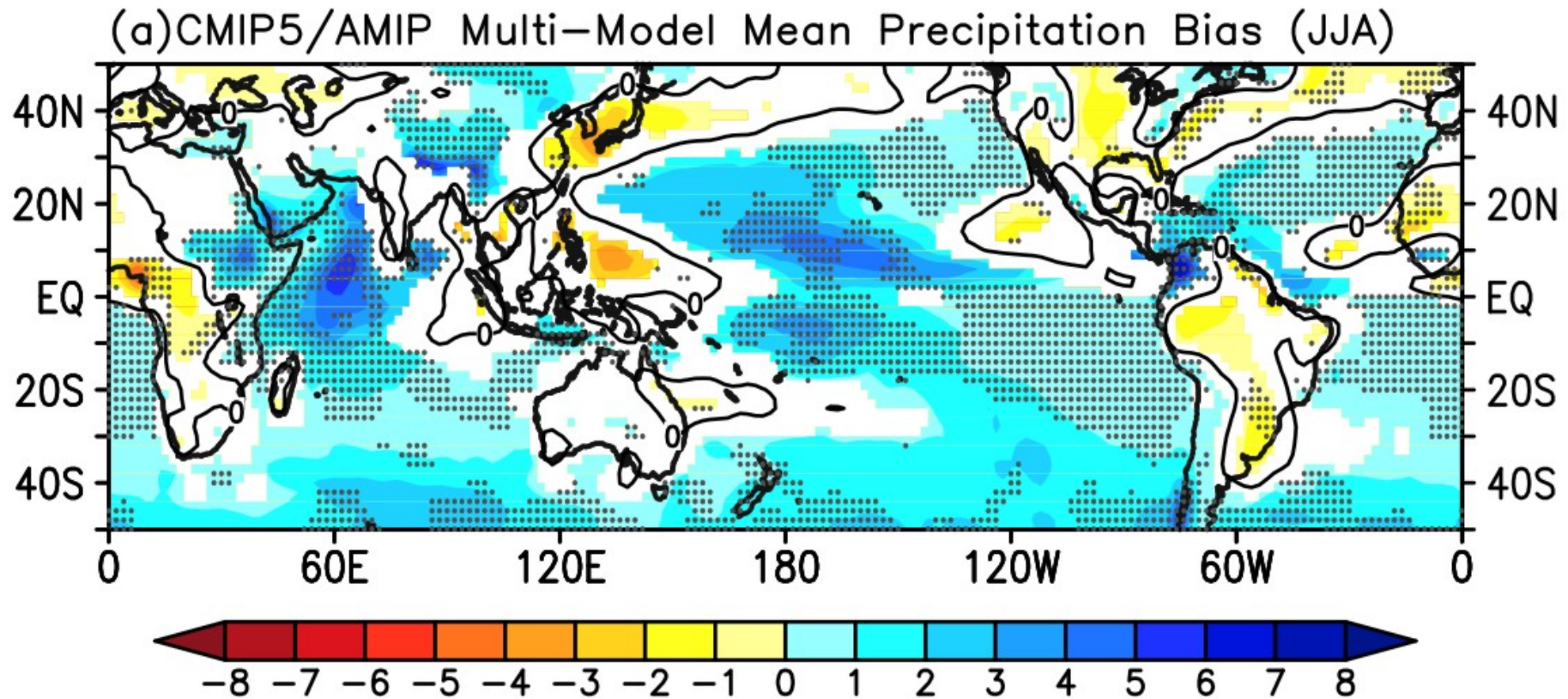
Illustrated  
in following  
slides



- Xie et al. (2013) Relationship between short and long timescale model errors *In prep.*
- Kamae, Y., and M. Watanabe, (2012): Tropospheric adjustment to increasing CO<sub>2</sub>: its timescale and the role of land-sea contrast. *Clim. Dyn.*, doi:10.1007/s00382-012-1555-1.

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# Systematic climate errors in precipitation



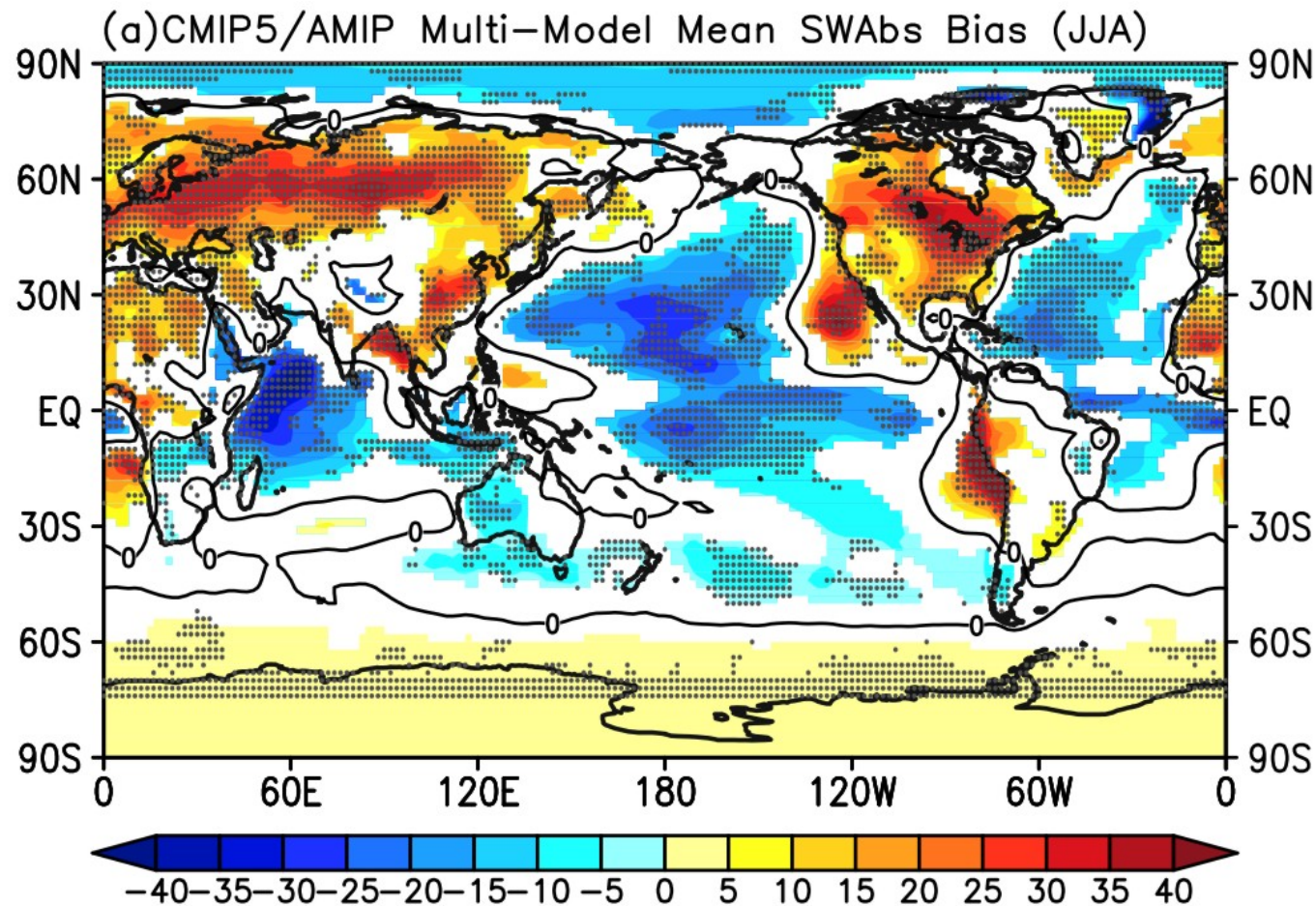
- Many systematic biases in the CMIP5/AMIP runs can be identify through short-term hindcasts (stippled regions)

H.-Y. Ma & S. Xie (PCMDI)

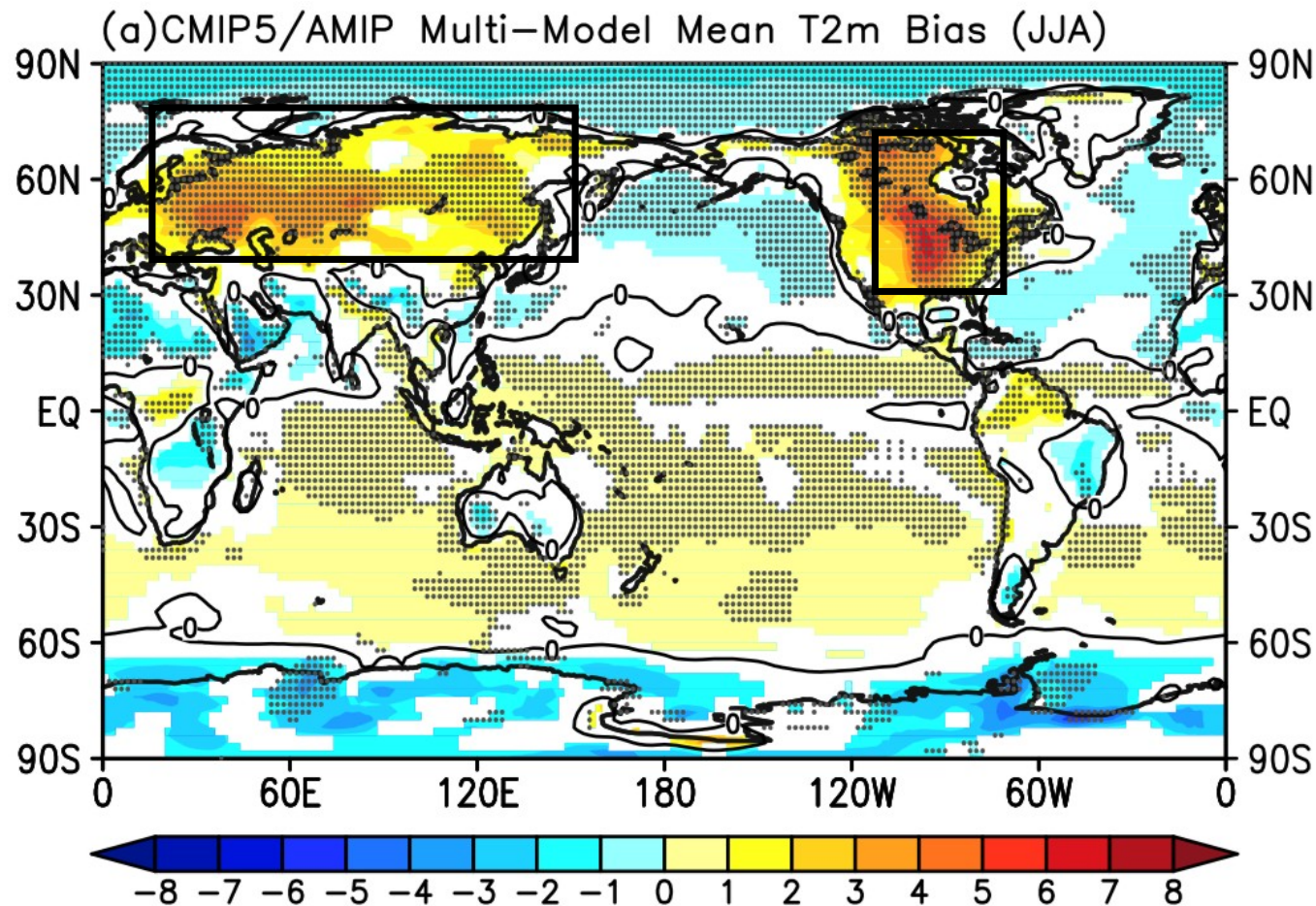
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# Biases in net shortwave at TOA (SWAbs)



# Biases in 2-meter temperature (T2m)



- Strong similarity between hindcast and climate bias patterns
- Strong warm biases over mid-latitude land

H.-Y. Ma & S. Xie (PCMDI)

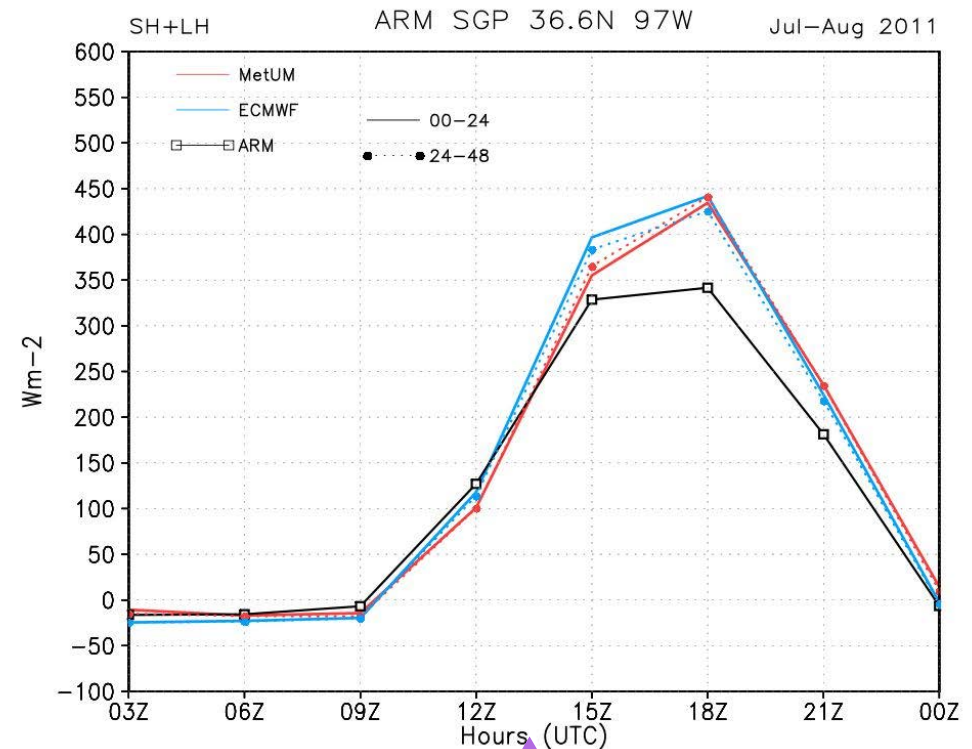
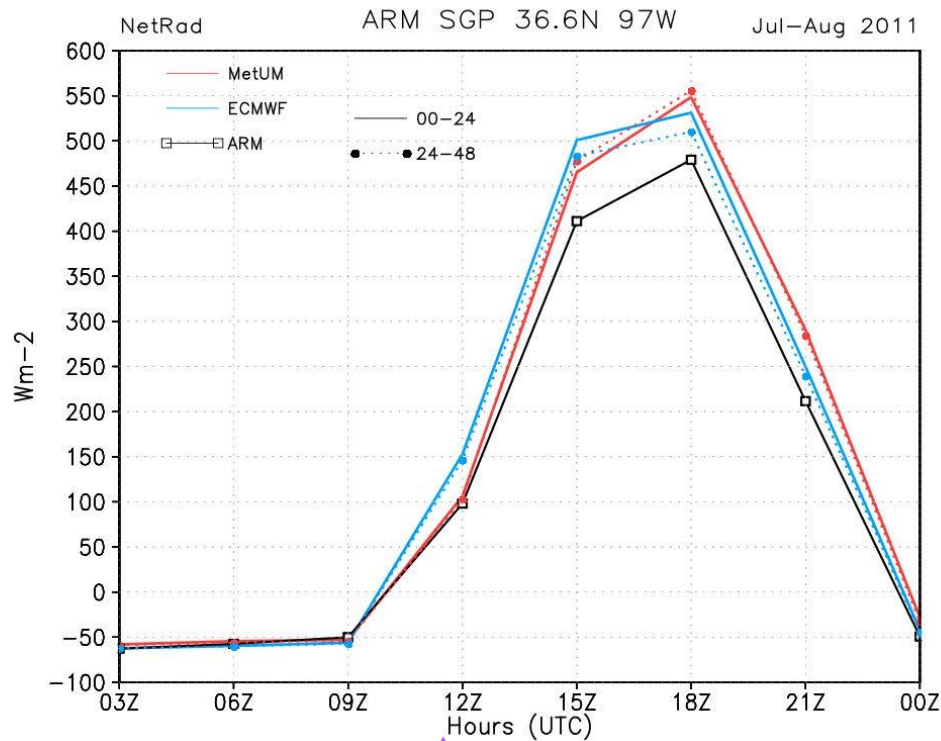
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# SGP-ARM site comparison

## Surface Energy Balance

Sean Milton



$$\underline{R_{\text{net}}} = SW_{\text{net}} + LW_{\text{net}} = \underline{H + \lambda E + G}$$

ECMWF & MetUM - excess daytime  $R_{\text{net}} > 50 \text{ Wm}^{-2}$



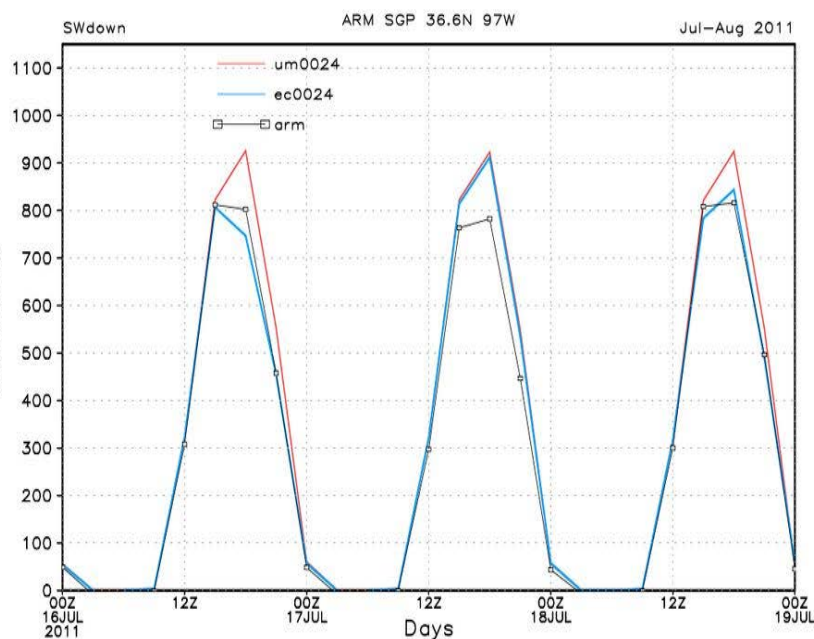
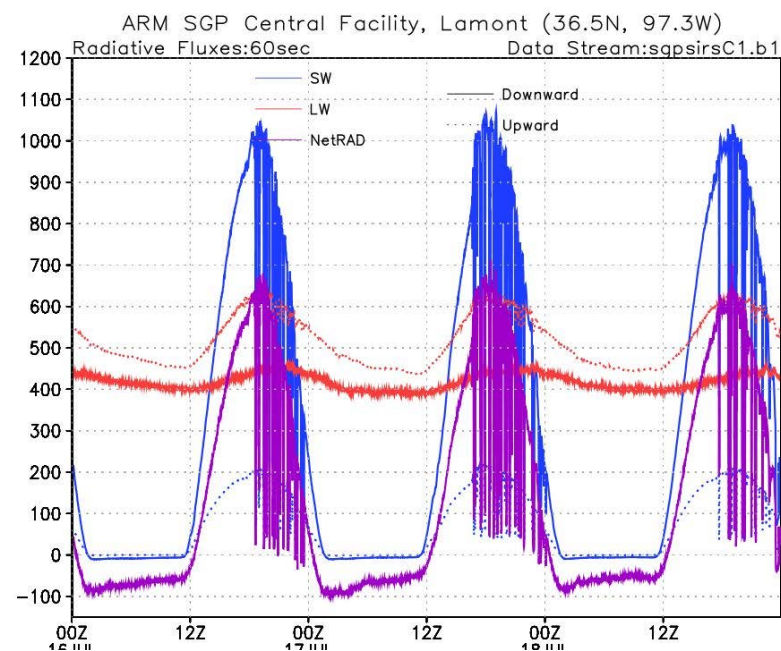
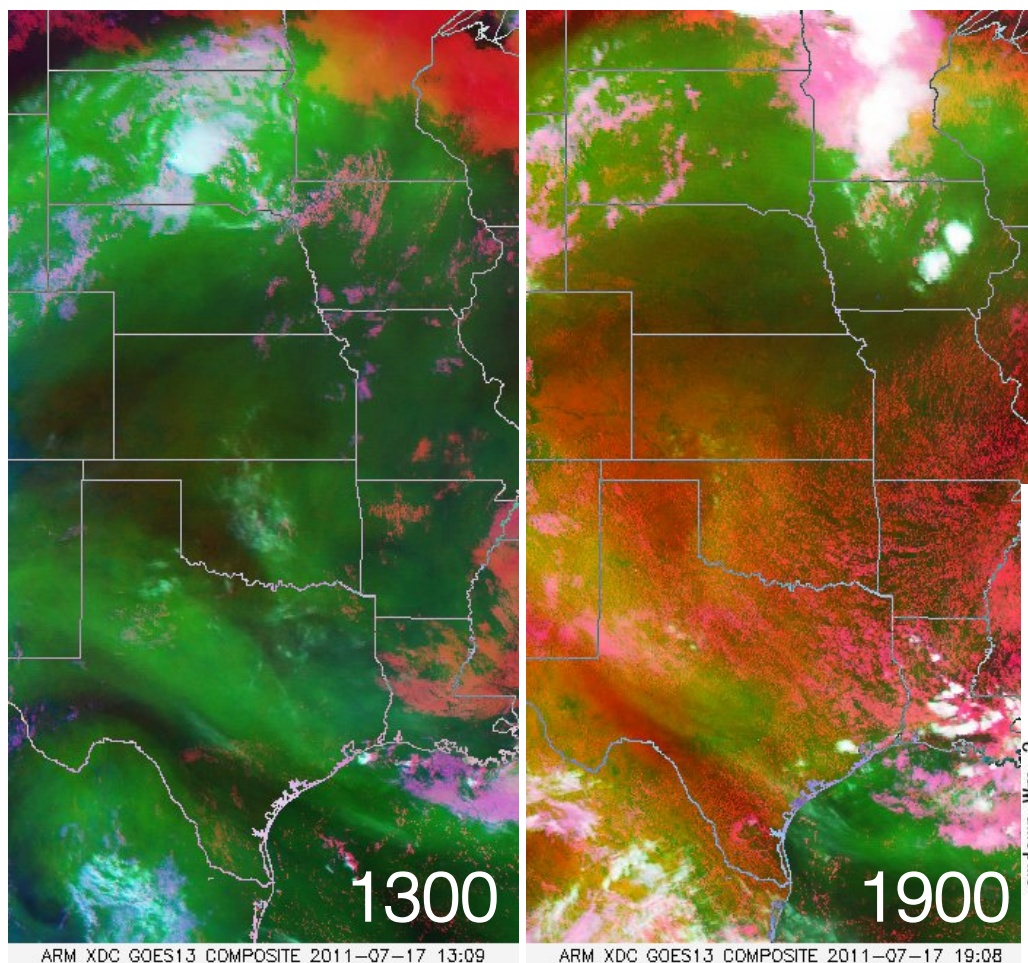


Met Office

# Fair Weather Cumulus: 16-18 Jul 2011

Sean Milton

## 17 July - GOES



[http://www.xdc.arm.gov/data\\_viewers/spggoes\\_composite/](http://www.xdc.arm.gov/data_viewers/spggoes_composite/)



# What has been successful?

- More centres submitted data than to T-AMIP I / CAPT.
- Consequently more centre's now have the ability to easily run this type of expt in the future.
- Comprehensive set of diagnostics saved (e.g. satellite simulators) and the data are much more accessible thanks to being on the ESG.
- Methodology widely supported and strongly encouraged at key workshops (e.g. *WGNE systematic errors workshop*, *Pan-GASS meeting*) as necessary to fix model biases.
- The methodology is now being used by other MIP's (e.g. YOTC MJO-TF/GASS diabatic processes project), with a very strong take up (more models submitted to this than T-AMIP II)

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# What has been less successful?

- The data have been under-utilised with only a handful of analysis projects being conducted.
  - *Not obvious why this is the case. Possibly the funding for analysis projects is more focussed around climate change projections than evaluation of processes? (although the two are not mutually exclusive!)*
  - *The data will remain in place and use of the data are still strongly encouraged!!!*
- Hard to cover everyone's needs with set hindcasts/diagnostics lists (e.g. those studying MJO likely to want different cases than those studying mid-lat depressions)

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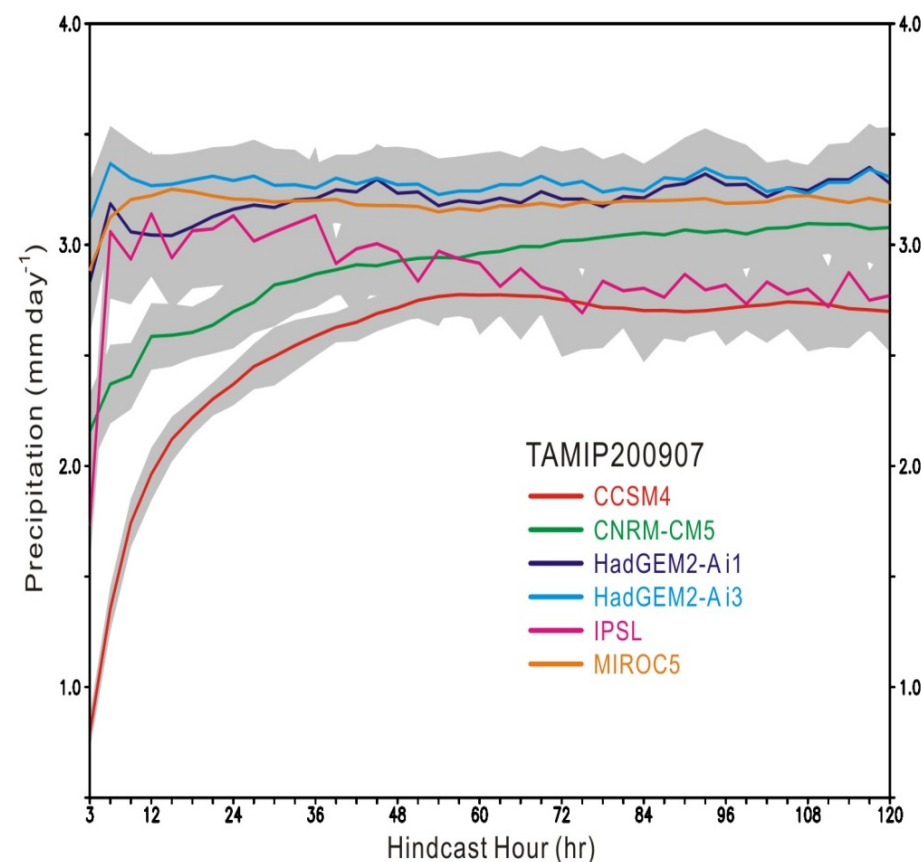
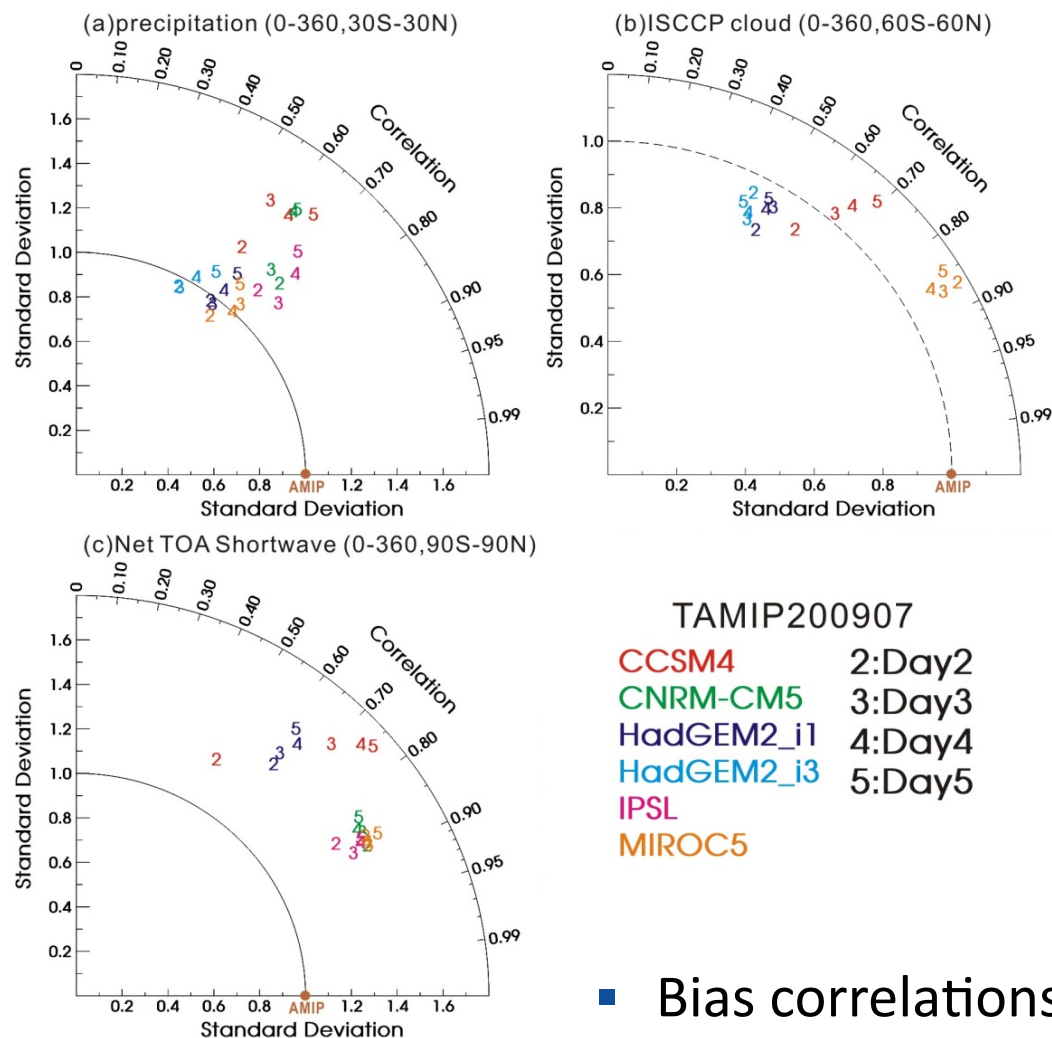
# The future

- The steering committee share the view that any new T-AMIP expts are best formed around a particular science question (e.g. continental warm bias; cloud biases; MJO)
- Should T-AMIP continue and be part of CMIP6 covering one or two of these science questions, or should it stop as a project and the methodology be used within other MIPs?
- Transpose-CMIP (raised at the WGNE workshop) – would require exploratory work, unlikely to be ready for CMIP6?

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# Initial spin-up of the hindcasts



- Bias correlations generally saturated fast after Day 2
- Small impacts of choice of analysis