



# Transpose-AMIP

Steering committee: Keith Williams (chair), David Williamson, Steve Klein, Christian Jakob, Catherine Senior

CFMIP/EUCLIPSE meeting, 07/06/11

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# 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.

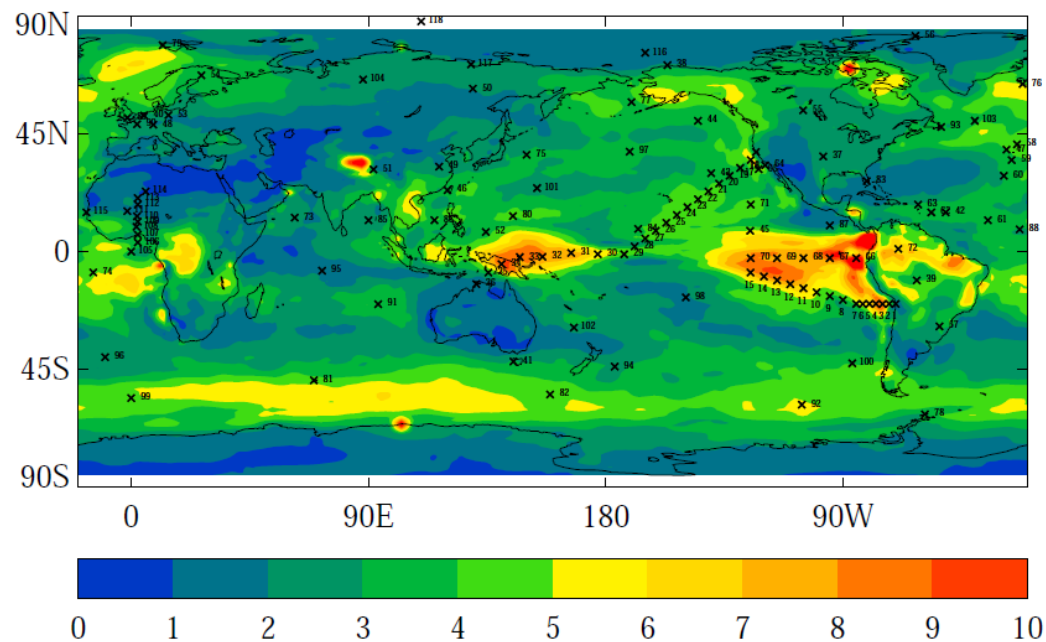
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# Why would I want to do that?

- To test model's parametrizations while the circulation is still close to observed.
- To evaluate processes operating in the model against observations for particular events (e.g. ARM/Cloudnet sites, actual A-train passes, etc.)
- To be able to comment on the ability of models taking part in CMIP5 to accurately represent fast processes.

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- Although not formally part of CMIP5, data formats and the process for downloading will be the same.
- The transpose-AMIP II diagnostic lists are largely based on the CFMIP component of the CMIP5 lists (including COSP output, etc.).
- Data will be saved globally every 3 hours and the CFMIP sites diagnostic list will be saved every 30 mins.



Includes:  
ARM sites  
Cloudnet sites  
GPCI

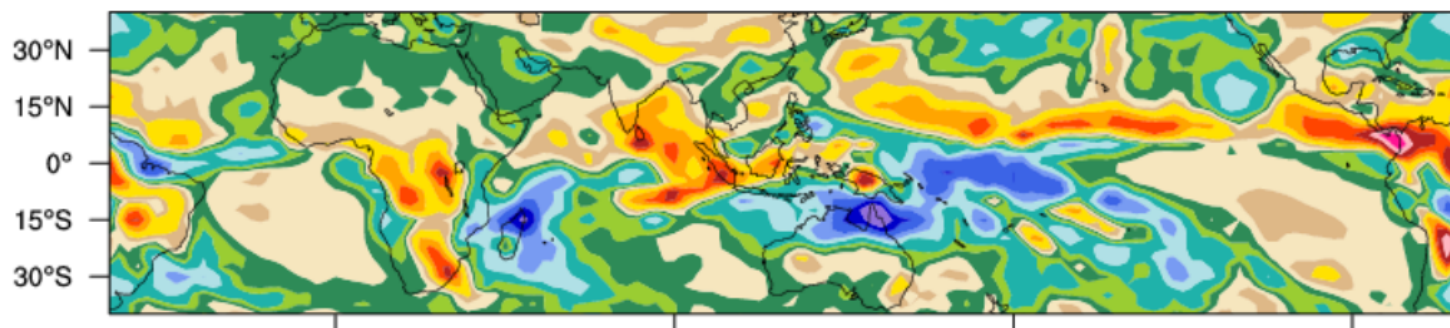
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# GFDL precipitation biases

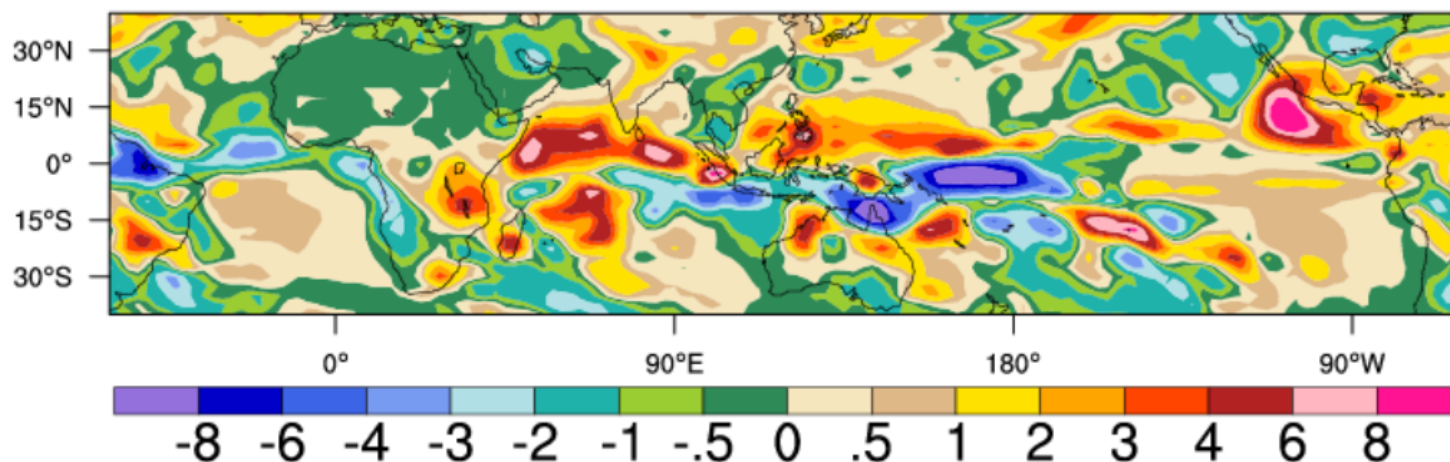
PPT Day3 AM2-CMAP DJF

Day 3 error



AM2-CMAP\_DJF\_1992-3

AMIP error



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# Status of Transpose-AMIP II



# Transpose-AMIP II data are **now available!**

A full data submission from HadGEM2 are available for download – see [www.transpose-amip.info](http://www.transpose-amip.info) and click on ‘accessing data’

The following centre’s have also indicated they will run Transpose-AMIP II expts:

- EC-Earth (Frank Selten)
- IPSL (Sandrine Bony)
- Meteo France (Michel Deque)
- MIROC (Masahiro Watanabe)
- MPI (Bjorn Stevens)
- MRI (c/o Masahide Kimoto)
- NCAR (David Williamson)

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# Proposed diagnostic subprojects:

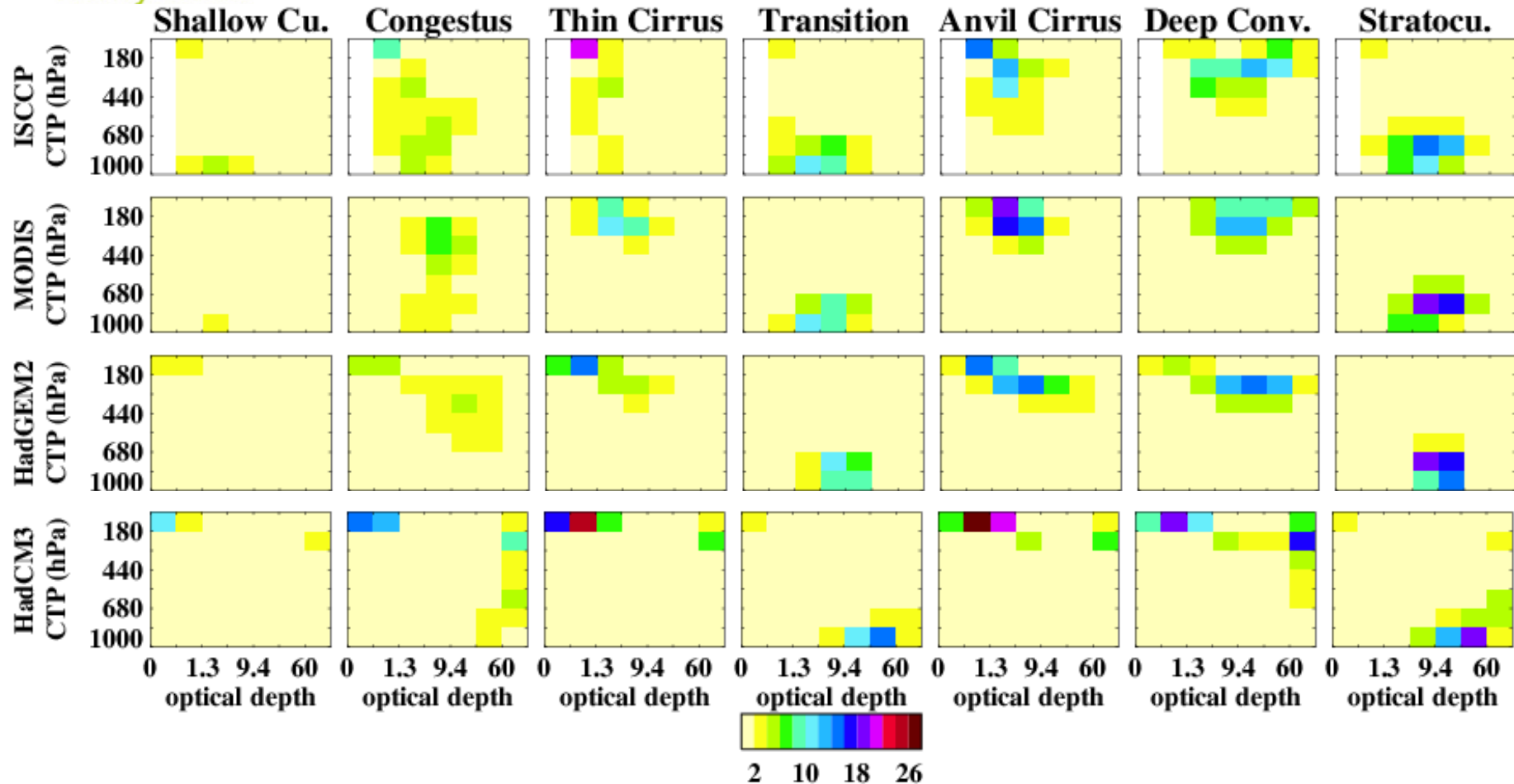
- MJO dynamics in the Transpose-AMIP II hindcasts: (PI: Mitch Moncrieff)
- Water budget analysis (PI: Gill Martin)
- Comparison of methodologies (initial tendency using own analysis vs 5-day forecast using alien analysis) (PI: Mark Rodwell)
- Cloud regimes (PI: Keith Williams)
- Relationship between short and long timescale model errors (PI: Shaocheng Xie)
- Intense extratropical windstorms (PI: Peter Knippertz)
- Comparison of current climate and NWP models (PI: TBD)
- Regional investigation into model tendencies (PI: TBD)
- VOCALS analysis (PI: TBD)
- 2009 SE Asian monsoon analysis (PI: TBD)

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# Example analysis: Cloud regime biases

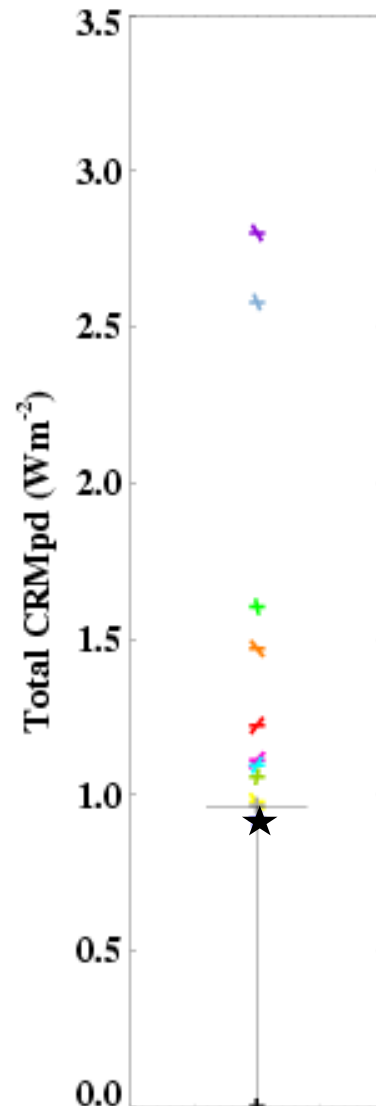
# Climatological cloud regimes



Williams and Webb (2009)

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# Cloud Regime Error Metric



CREM: A scalar metric assessing the properties of simulated cloud regimes

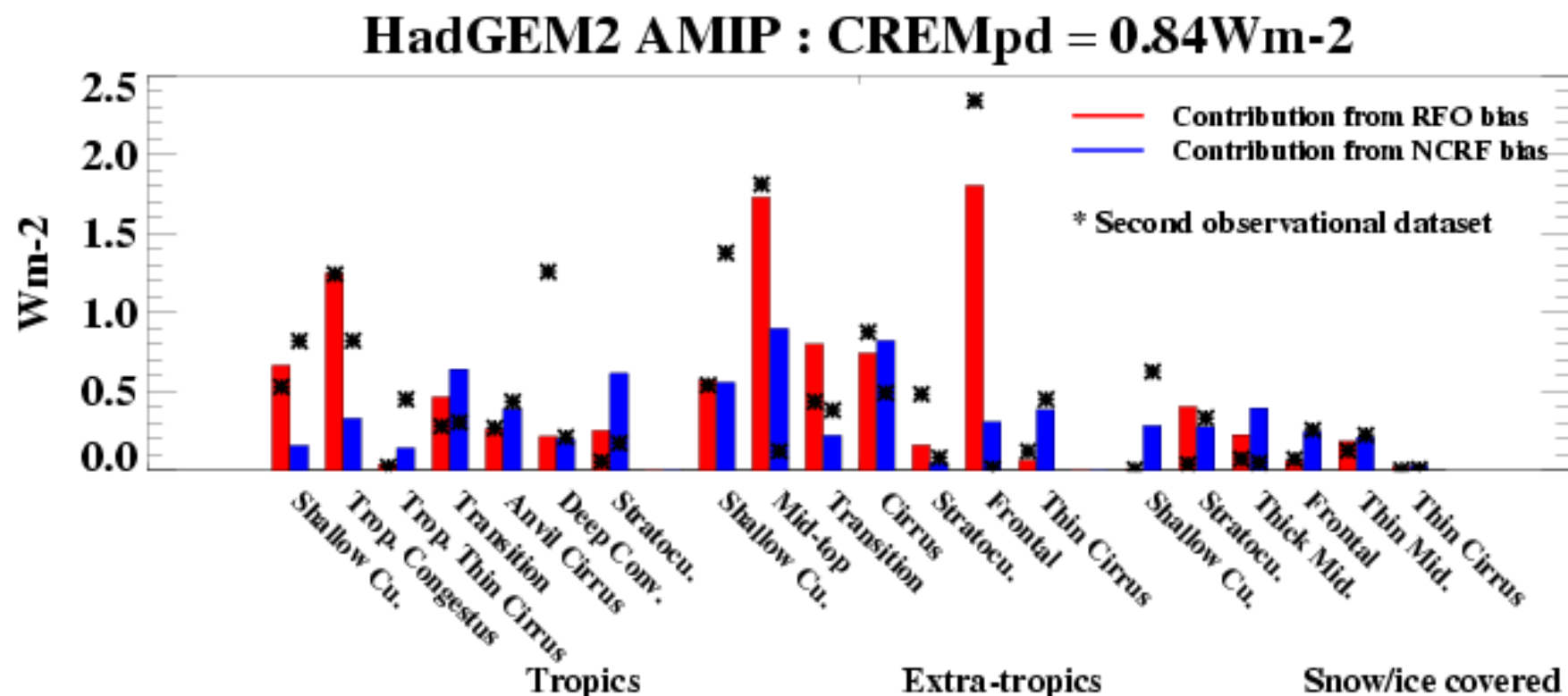
Proposed to the climate metrics panel for use in CMIP5 assessment

Williams and  
Webb (2009)

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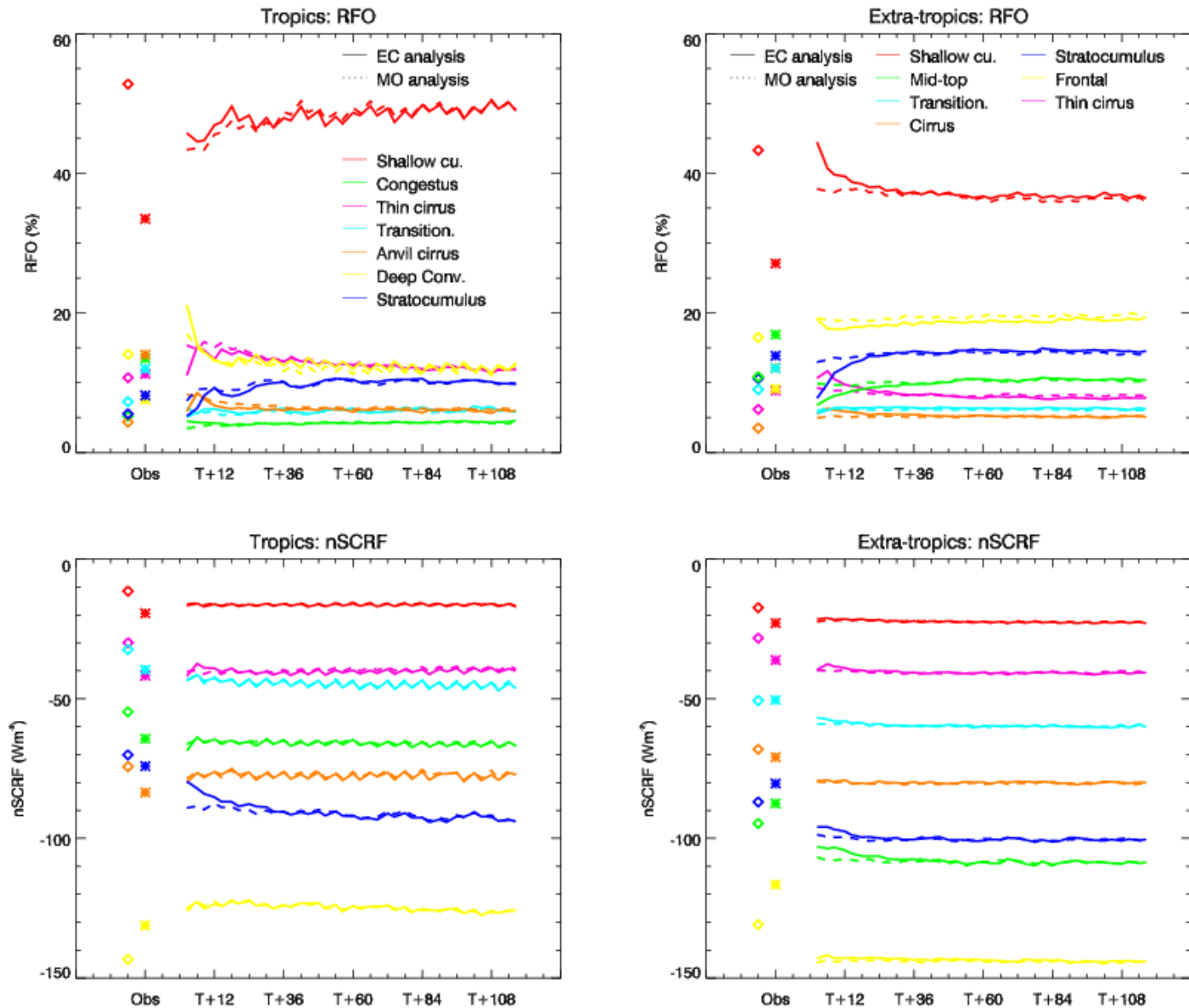
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# Break-down of CREM for HadGEM2



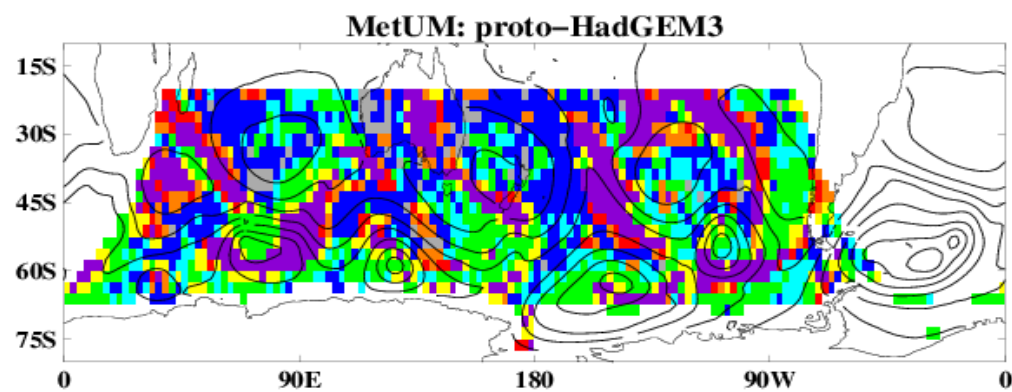
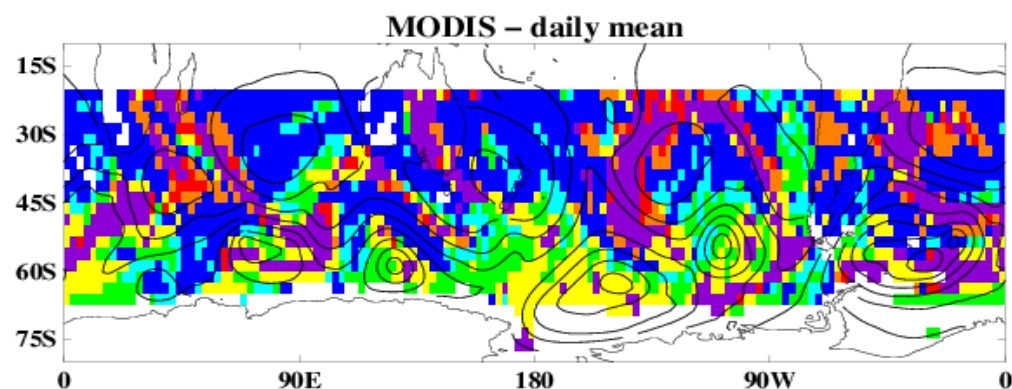
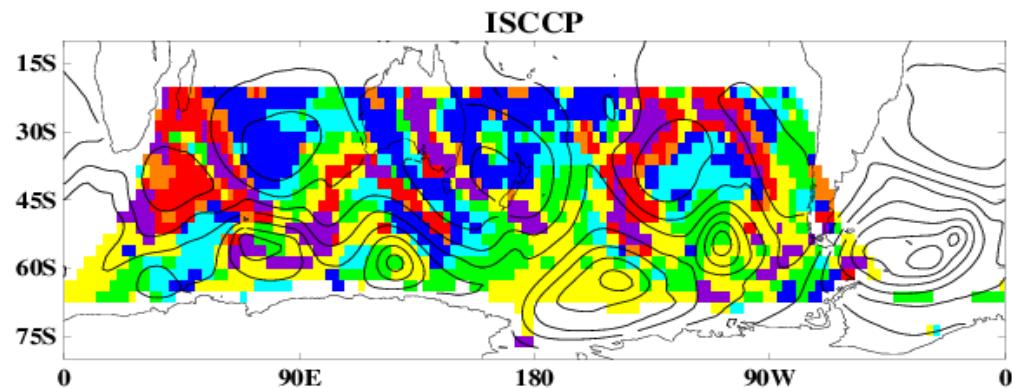
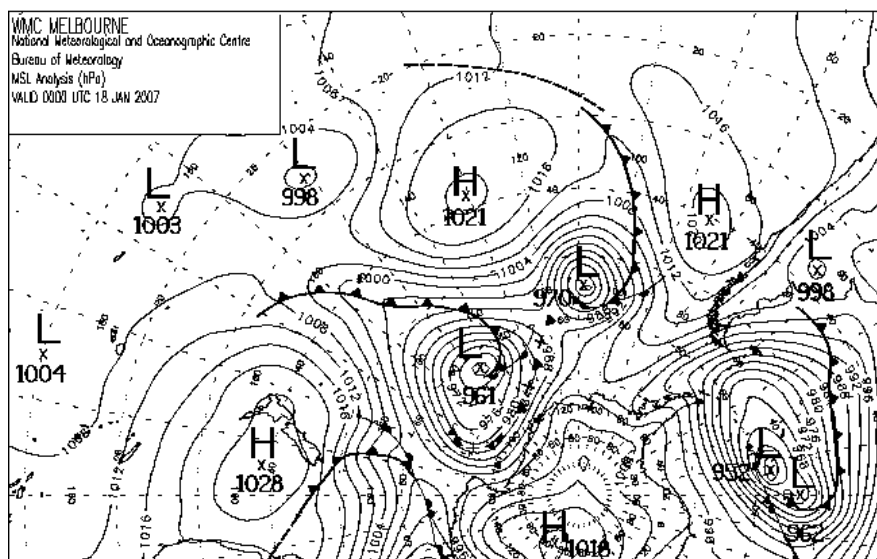
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# Cloud regime biases in Transpose-amip II simulations



Following  
Williams and  
Brooks (2008)

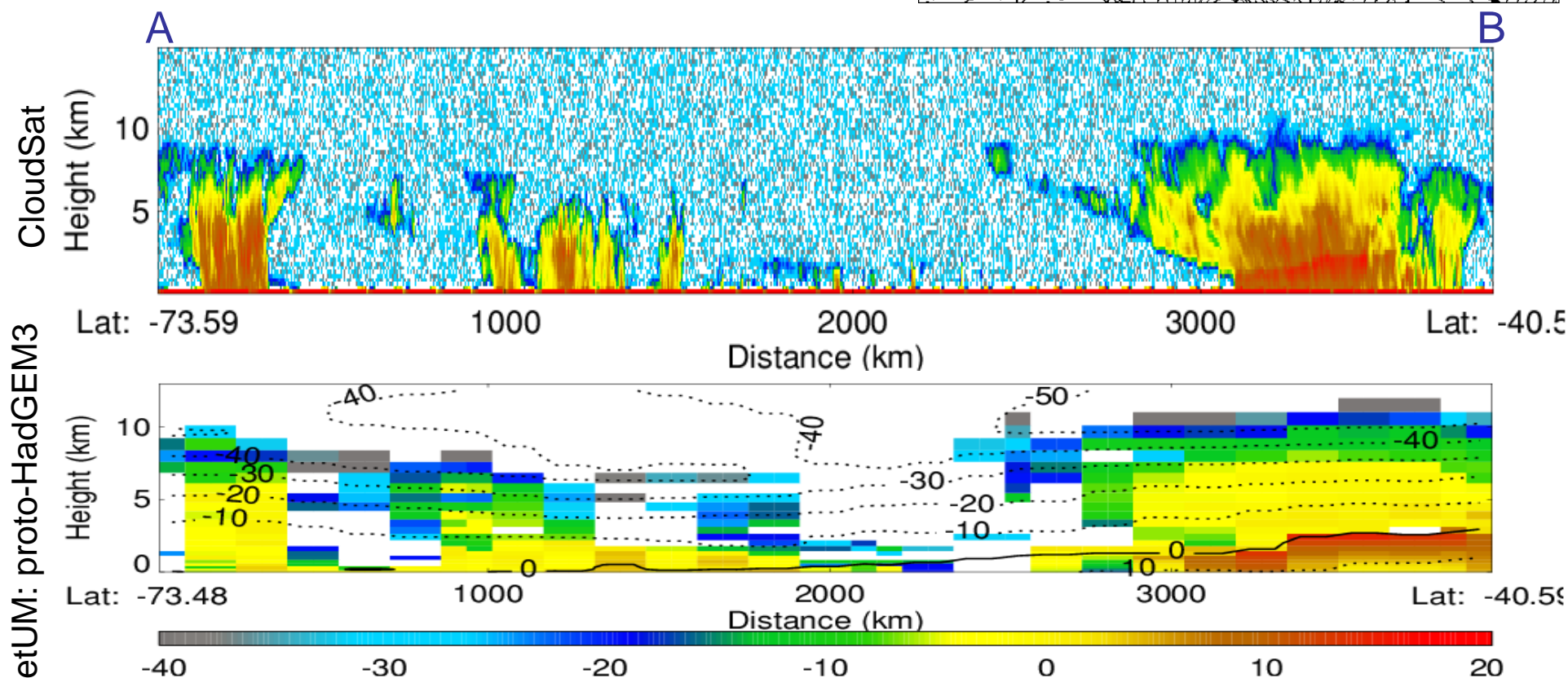
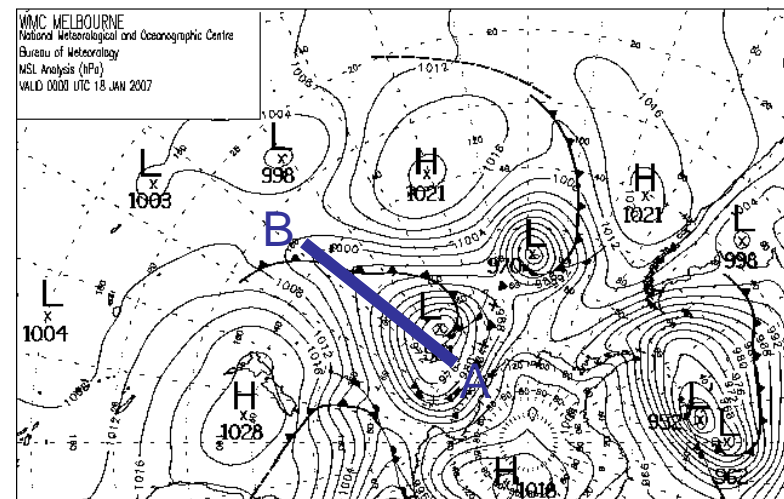
- Clear-sky
- Shallow Cu.
- Transition
- Stratocu.
- Mid-level
- Thin Cirrus
- Cirrus
- Frontal



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# Comparison with CloudSat using COSP



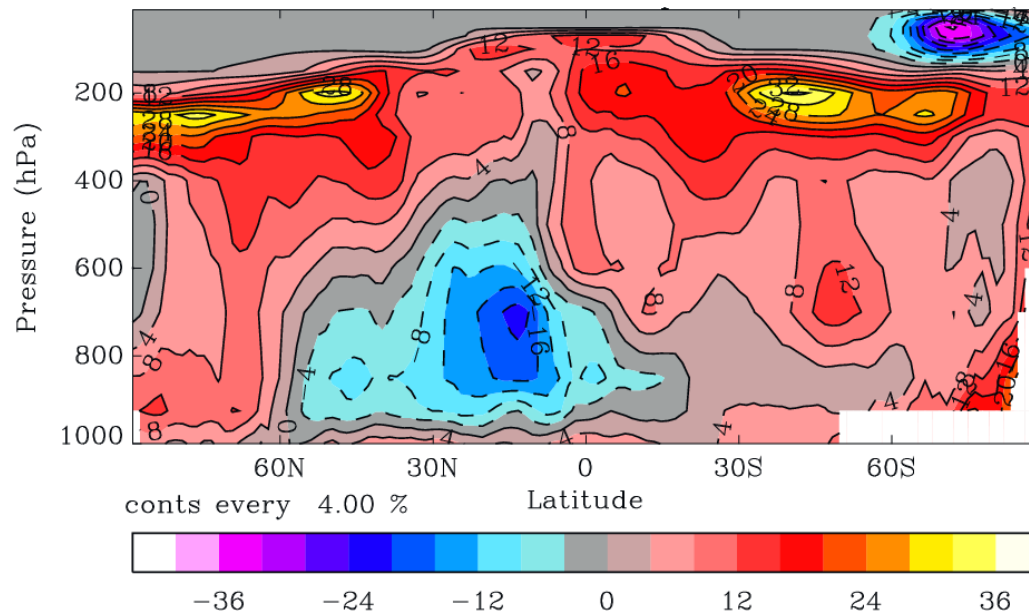
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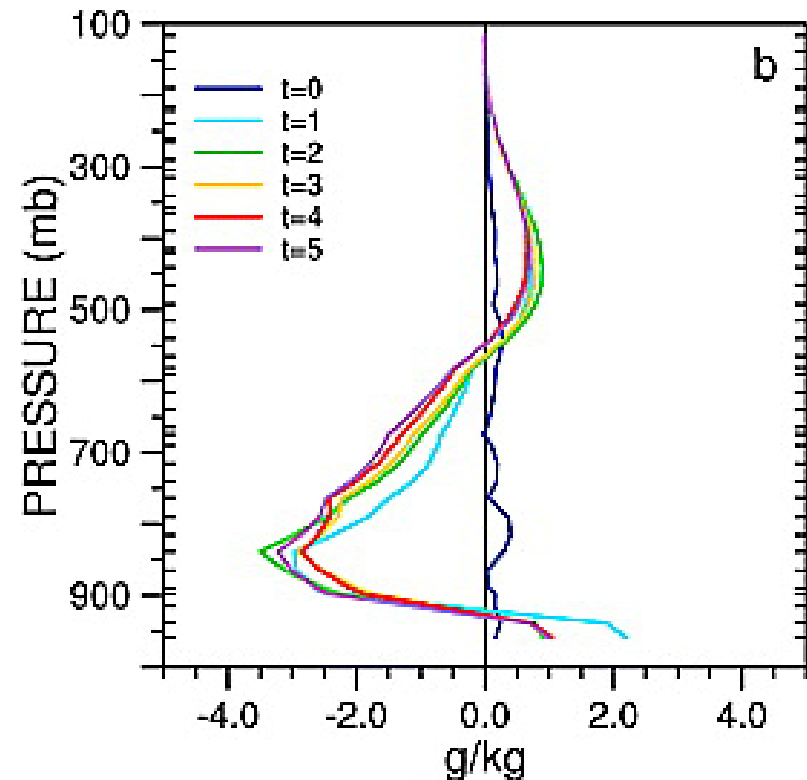
# Example analysis: Dry lower troposphere

# CAM humidity errors

Zonal mean climatological RH bias

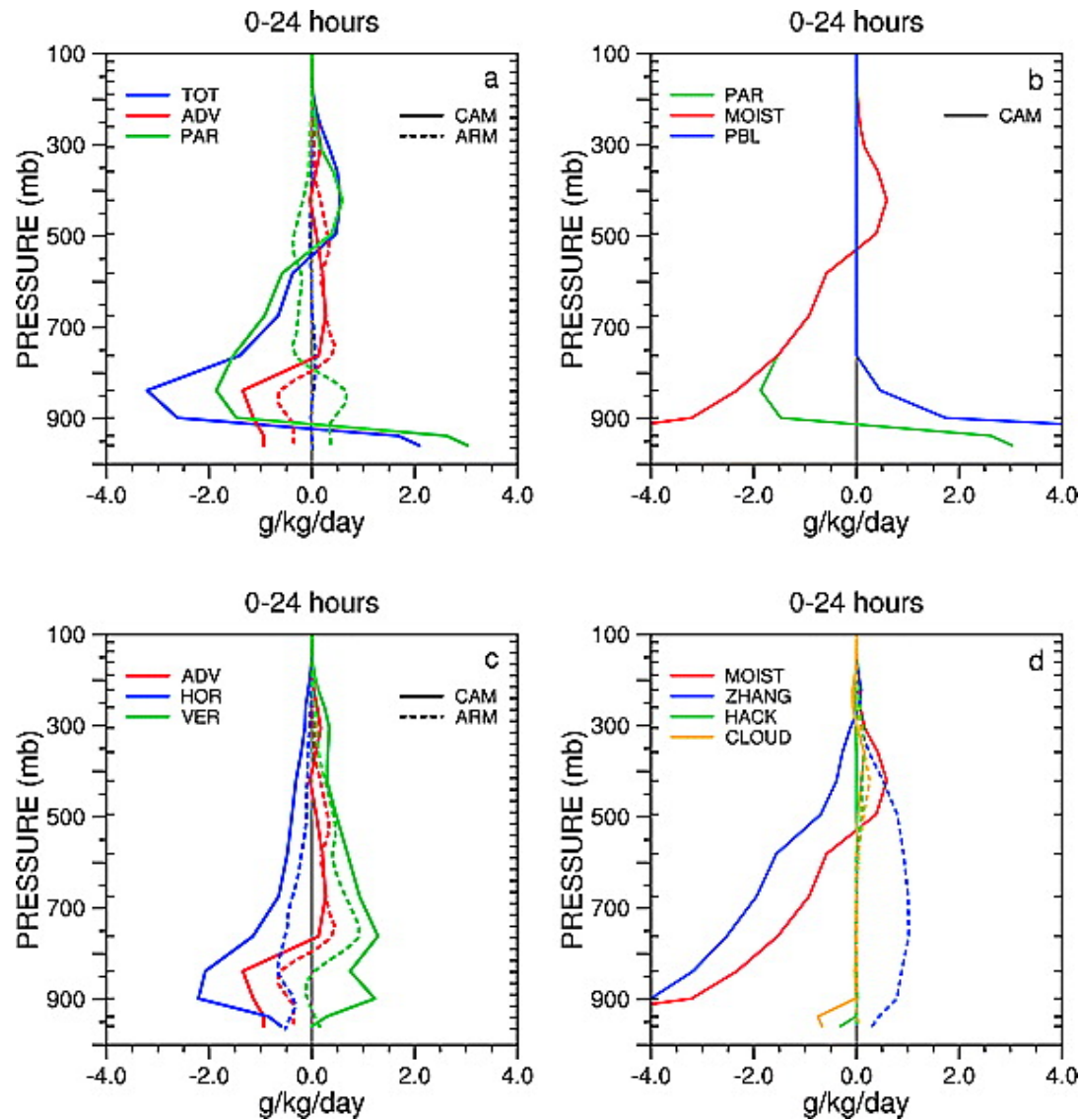


Hindcast evolution of q biases over SGP site



Williamson et al. (2005)

# Breakdown of hindcast tendencies



Williamson et al. (2005)

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# What can I do now?



# What can I do now?

- Run the Transpose-AMIP II expt with your model!
  - All the information to run the transpose-AMIP II experiment with your model is on the website.
  - Details of how to process and submit data (incl. MIP tables for use with CMOR) are also available from the website.
- Consider what analysis you (or someone in your centre) might do.
  - Please submit more analysis sub-projects, or take on an existing one where there is no PI.
- Begin your analysis!
  - Download the existing data and develop your analysis software. As data from more models become available, they can be added to your results.
  - There will be a section on Transpose-AMIP in AR5 where we can point to papers which analyse the data (submit papers by Jul 2012 (ideally Nov 11)).

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# More information

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






**Met Office**  
Hadley Centre








# But, but, but,..I can't do that because...

- It's hard to initialise from another model's analysis. 
- It's straightforward. Anyone can download ECMWF YOTC fields from ECMWF's website in netCDF or GRIB. Guidance on how to do the interpolation is provided. It's then only as hard as forming an initial condition file for your system
- It's hard to initialise land surface/aerosols/model specific prognostics. 
- The experimental design has been left quite open to allow centres to choose the option which suits them best.
- There is a large initial adjustment when starting from an alien analysis so analysing the first 5 days is meaningless. 
- Experience at the Met Office suggests that the gross climate errors are apparent after 6-12 hours regardless of the analysis. However, this can be checked by comparing the core and optional expts.

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# But, but, but,..I can't do that because...

- Climate model errors have nothing to do with short-range forecast errors. 
- Studies with many different models show that this is untrue. Most model systematic errors occur early in the forecast.
- Our centre has enough to do already with CMIP5. 
- We are sympathetic to this, but these expts comprise less than 1 year of model simulation and typical data volume is less than 0.5TB. All diagnostics already appear in the CMIP5 lists and data submission follows the same format as for CMIP5.
- You would say it's easy, the Met Office has a Unified Model. 
- The CAPT team in the US have shown conclusively that this approach can be used for climate models which don't have an NWP counterpart and have learnt things about their model from doing the expt.

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