



Transpose-AMIP update

Catherine Senior, Keith Williams

WGCM16, Hamburg, 24/09/12



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



Status of experiments:

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

www.transpose-amip.info



Proposed diagnostic subprojects:

- Relationship between short and long timescale model errors (PI: Shaocheng Xie)
- 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)
- Intense extratropical windstorms (PI: Peter Knippertz)
- VOCALS analysis (PI: Thomas Toniazzo)
- Timescale of tropospheric adjustment to increasing CO₂ (Masahiro Watanabe)
- Comparison of current climate and NWP models (PI:TBD)
- Regional investigation into model tendencies (PI: TBD)
- 2009 SE Asian monsoon analysis (PI: TBD)

www.transpose-amip.info



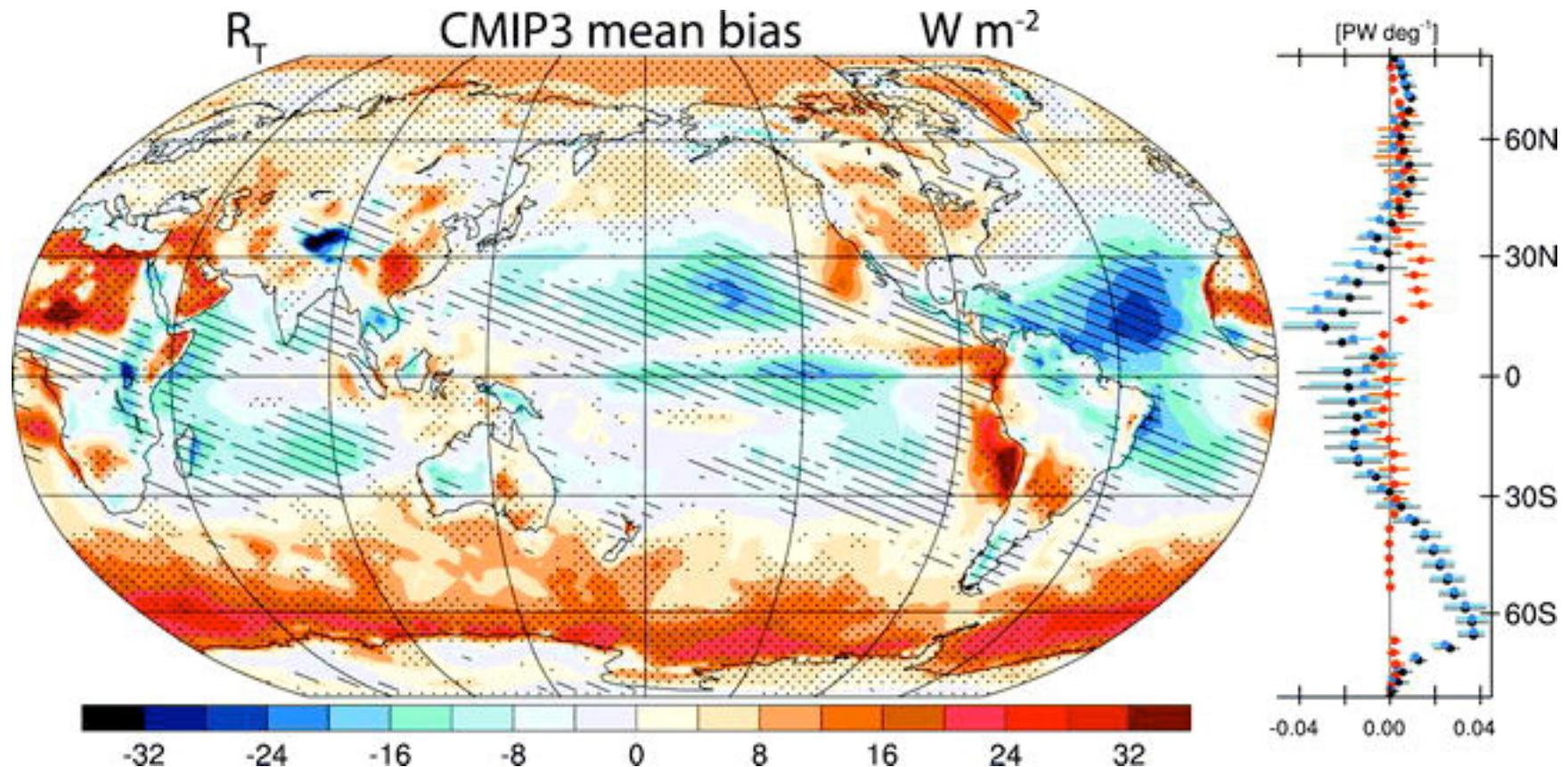
Transpose-AMIP II Papers

T-AMIP II
description
paper →

- Williams et al. (2012) The Transpose-AMIP II experiment and its application to the understanding of Southern Ocean cloud biases in climate models *J. Climate* Submitted.
- Xie et al. (2012) Relationship between short and long timescale model errors *In prep.*
- Kamae, Y., and M. Watanabe, (2012): Tropospheric adjustment to increasing CO₂: its timescale and the role of land-sea contrast. *Clim. Dyn.*, Submitted.

www.transpose-amip.info

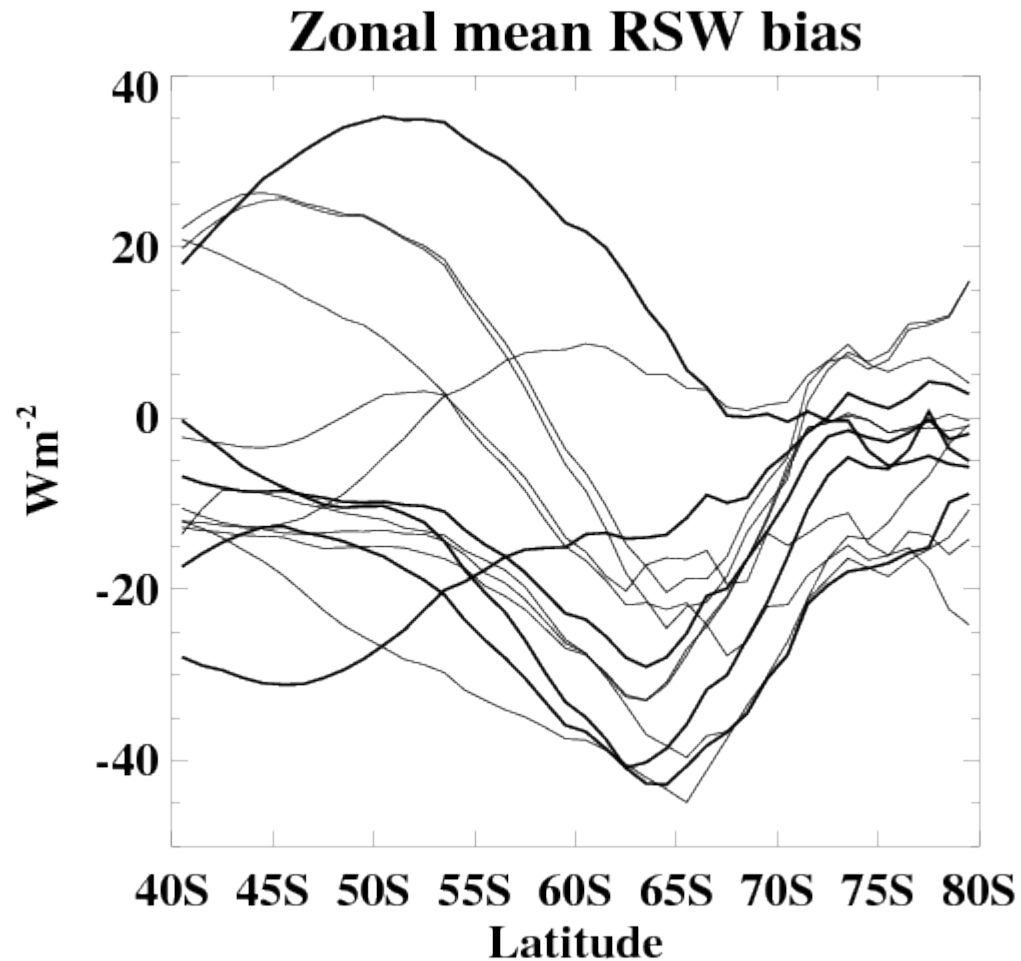
Why Southern Ocean clouds?



Trenberth and Fasullo (2010)

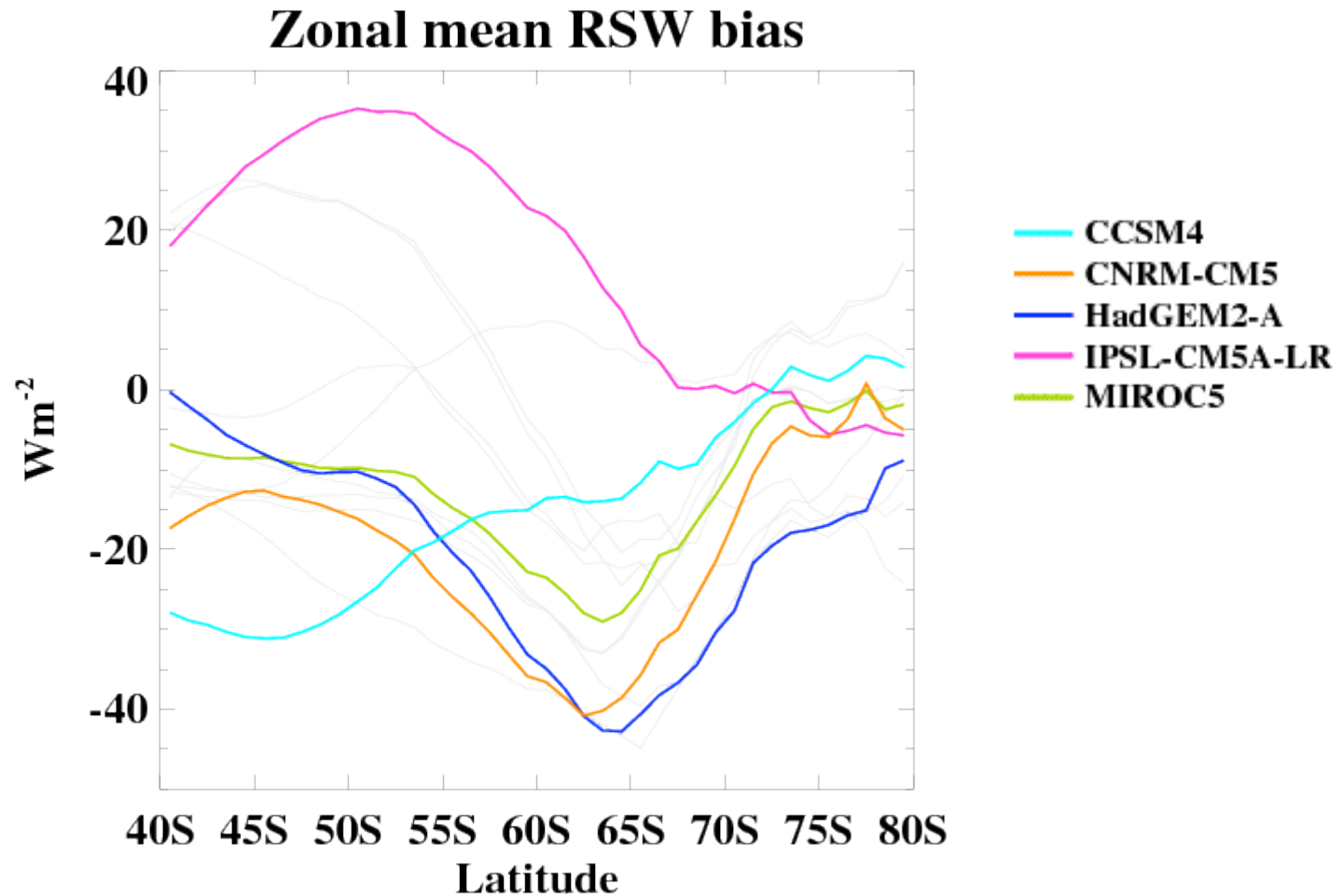
www.transpose-amip.info

Still a problem in CMIP5



www.transpose-amip.info

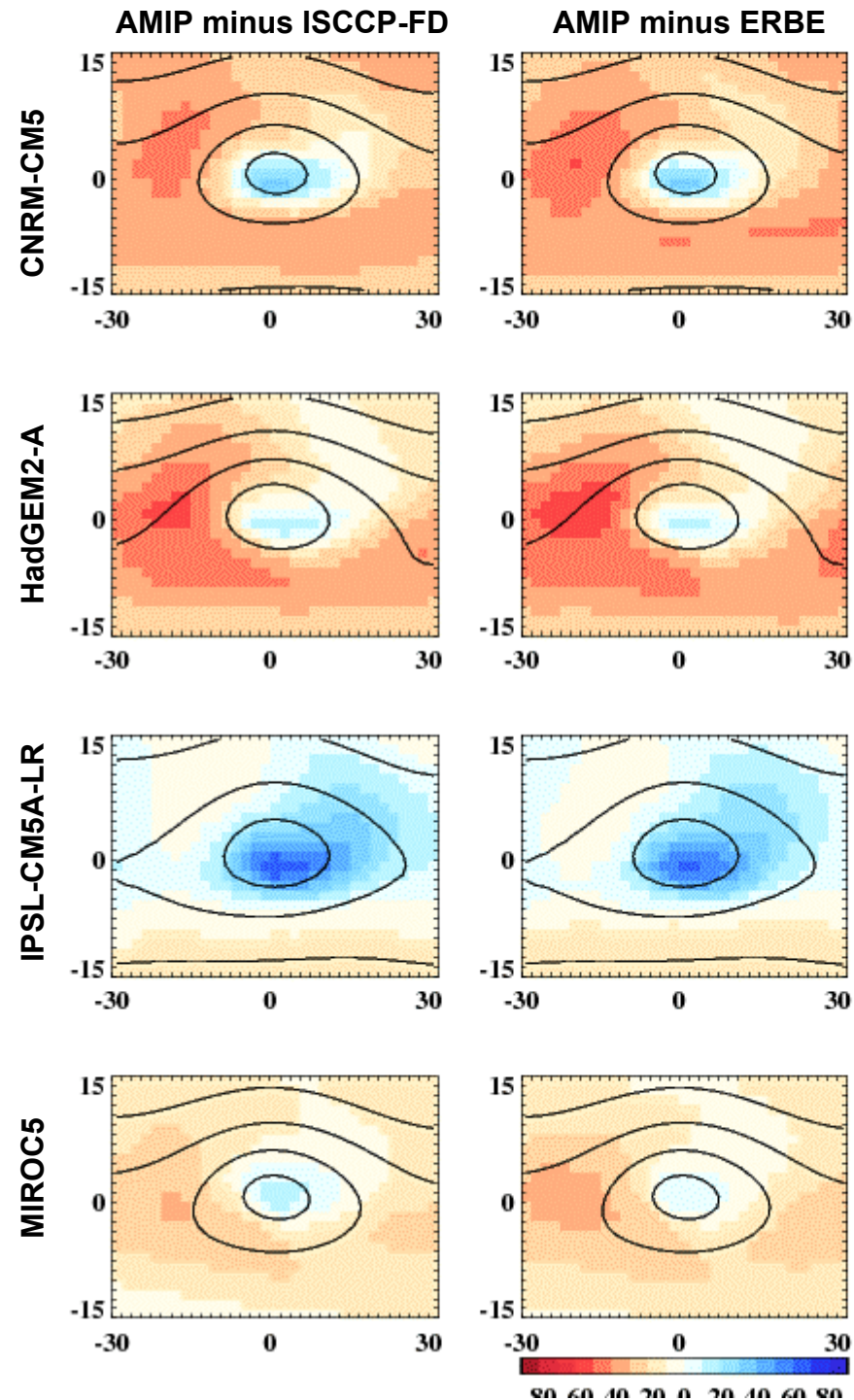
Still a problem in CMIP5



www.transpose-amip.info

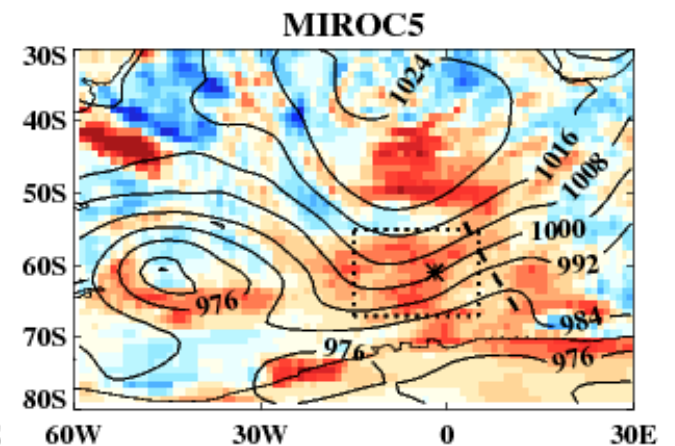
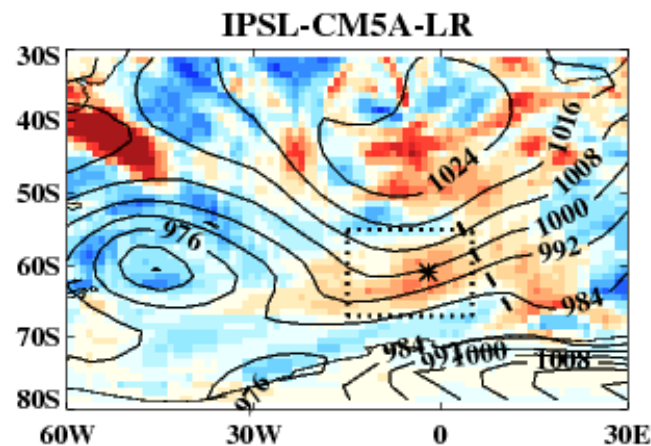
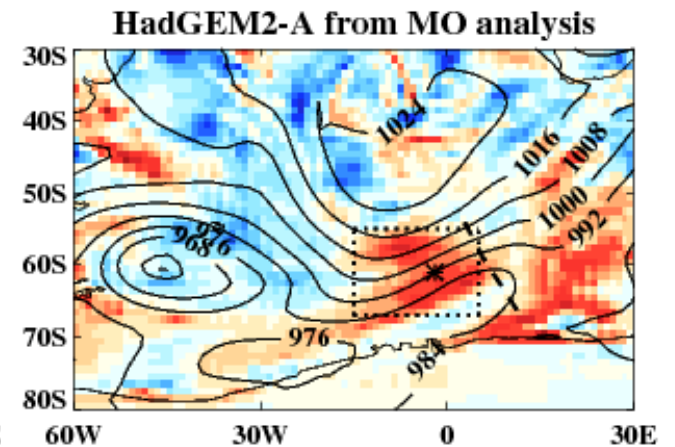
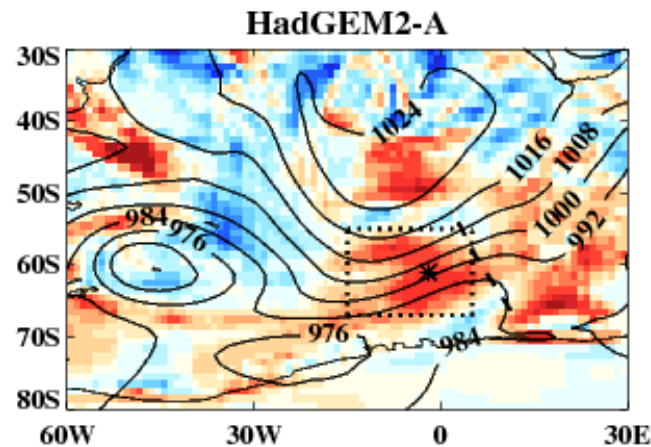
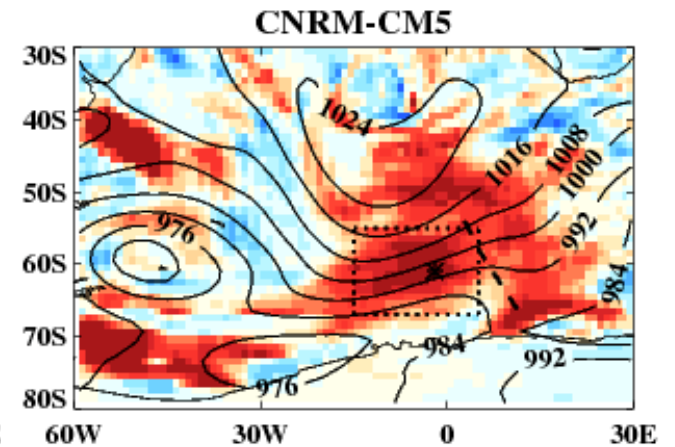
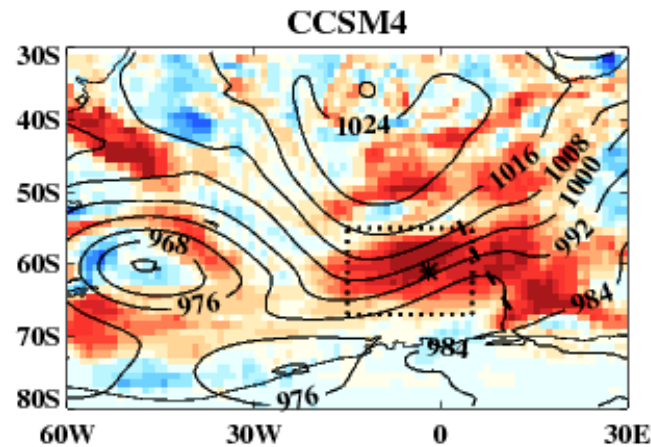
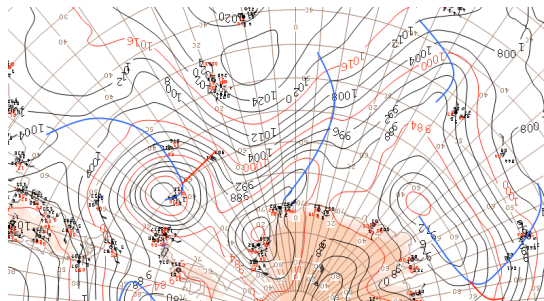
Cyclone composite of RSW bias

... plus cloud regime studies by Bodas-Salcedo et al. (2012) and Haynes et al. (2011)

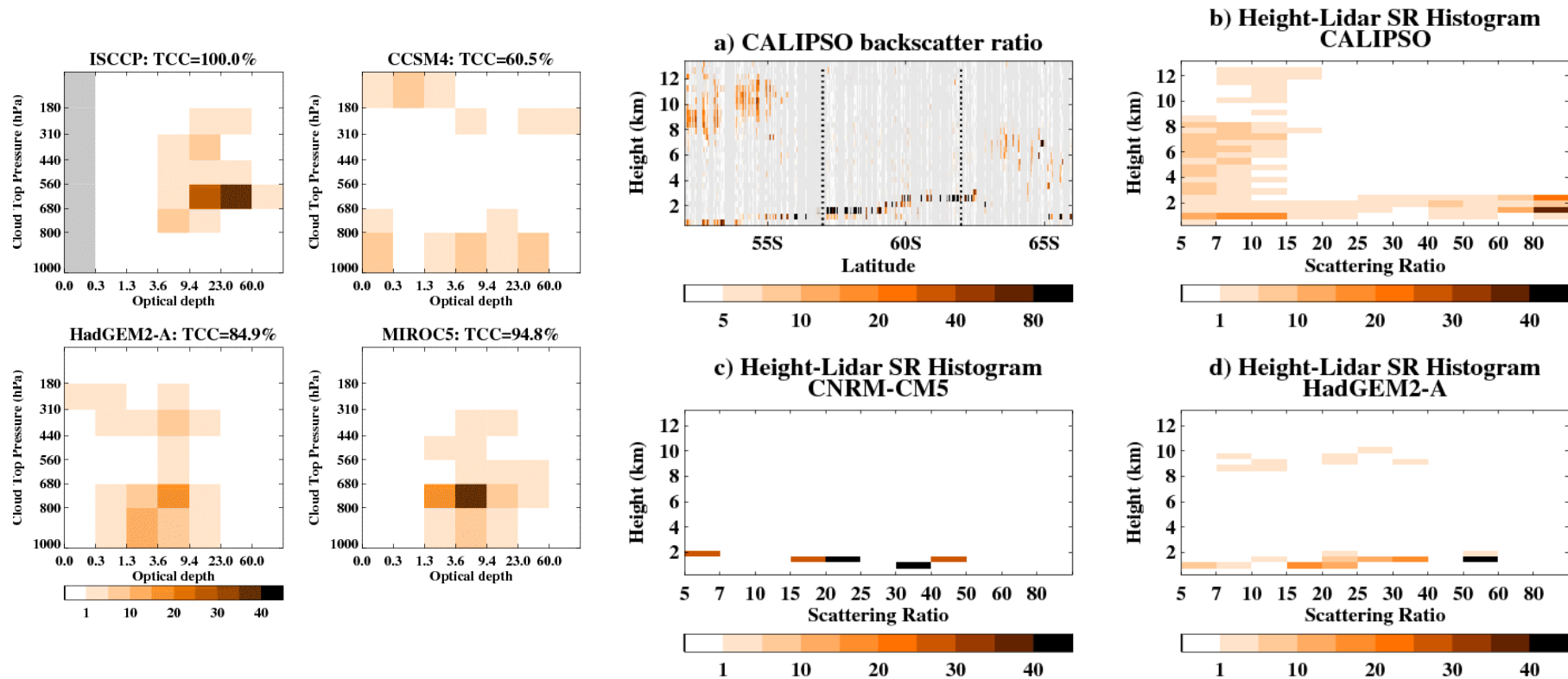




T+30 bias in RSW against CERES-FF



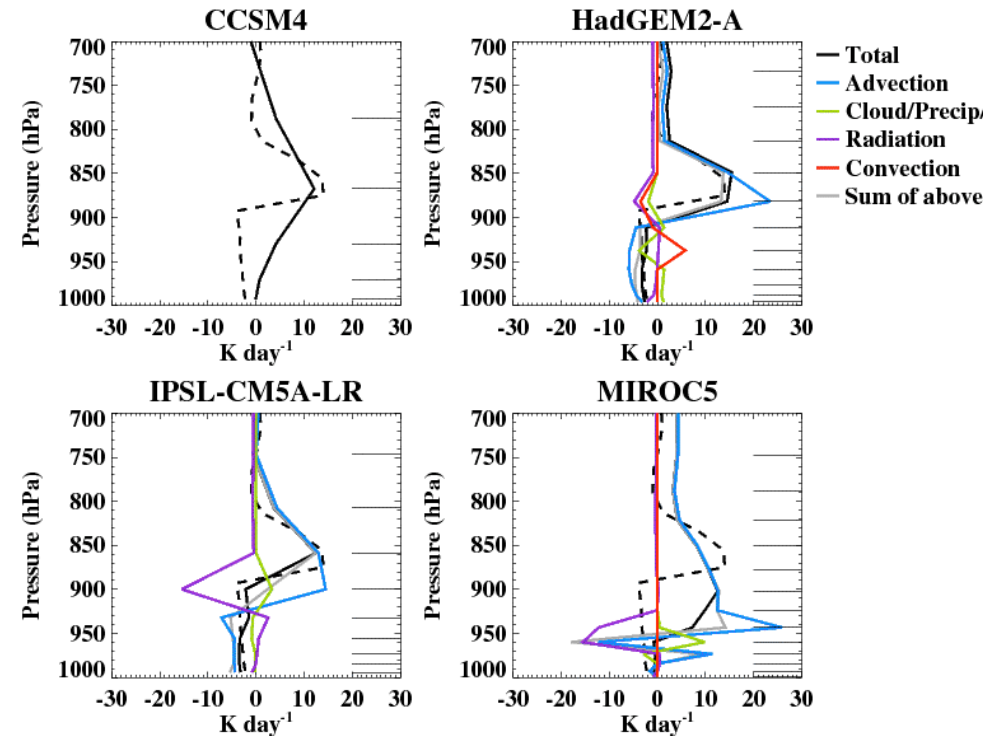
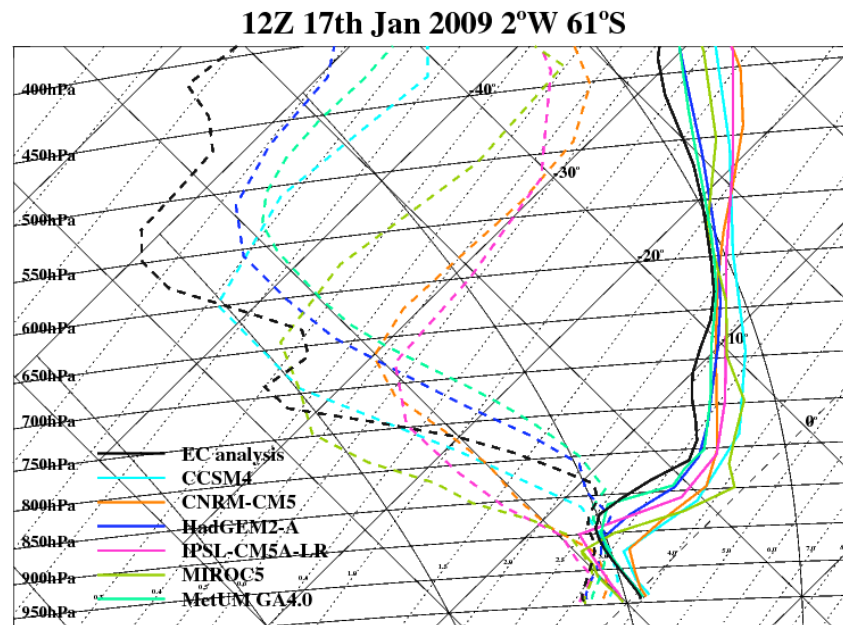
Comparison with observations: ISCCP and Calipso



... Modelled clouds typically too thin and tops too low

www.transpose-amip.info

Problems with boundary layer structure



...related to too low an inversion. Positive feedback between removal of cloud and evolution of the boundary layer structure

www.transpose-amip.info



Summary

- Transpose-AMIP permits detailed evaluation of climate models in a situation in which the large-scale dynamics is well constrained.
- Community is using the available models for a wide range of diagnostic studies aimed at improved understanding and representation of key processes and modes of variability
- First major paper targeted at Southern Ocean clouds
- Use of short range forecasts for climate model development becoming well established in WMO programmes (e.g. MJO studies in GASS) – should T-AMIP evolve into more of a ‘framework’ that can easily encompass new observational programmes? (but lots of data available for analysis now!)

www.transpose-amip.info