# TRANSPOSE AMIP

A WGNE proposal for intercomparison of
weather forecasts made by climate models

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Overall goal (of the approach)
-- obtain the benefits for climate model development and evaluation that have been realized in weather prediction model development
-- by applying climate models to weather forecasts

Allows direct comparison of parameterized variables with observations from field programs
e.g. clouds, precipitation, radiation fluxes

Development of a complete analysis system is not needed
Initial conditions obtained from NWP reanalyses

Goal (of the intercomparison)
-- encourage climate modeling groups to implement the forecast strategy into their model development process
-- compare characteristics of current models

WGNE initiative
Prototyped / developed jointly by NCAR and PCMDI
CAPT (CCPP-ARM Parameterization Testbed)


Phillips, T. J., G. L. Potter, D. L. Williamson, R. T. Cederwall, J. S. Boyle, M. Fiorino, J. J. Hnilo, J. G. Olson, S. Xie, J. J. Yio, 2004: The CCPP-ARM Parameterization Testbed (CAPT): Evaluating Parameterizations in General Circulation Models: Climate Simulation Meets Weather Prediction, *Bull. Amer. Meteor. Soc*., 85, 1903-1915.

Boyle, J., D. Williamson, R. Cederwall, M. Fiorino, J. Hnilo, J. Olson, T. Phillips, G. Potter and S. Xie, 2004: Diagnosis of Community Atmosphere Model 2 (CAM2) in NWP configuration at Arm Radiation Measurement sites, *J. Geophys. Res*., D15S15, doi:10.1029/2004JD005042.

Williamson, D. L., J. Boyle, R. Cederwall, M. Fiorino, J. Hnilo, J. Olson, T. Phillips, G. Potter and S. Xie, 2004: Moisture and Temperature balances at the Arm Radiation Measurement Southern Great Plains Site in forecasts with the Community Atmosphere Model (CAM2), *J. Geophys. Res*., 110, D15S16, doi:10.1029/2004JD005109.

Klein, S. A., X. Jiang, J. Boyle, S. Malyshev and S. Xie, 2006: Diagnosis of the Summertime Warm and Dry Bias over the U.S. Southern Great Plains in the GFDL Climate Model Using a Weather Forecasting Approach. *Geophys. Res. Lett*., 33, doi:10.1029/2006GL027567.

Williamson, D. L. and J. G. Olson, 2007: A Comparison of forecast errors in CAM2 and CAM3 at the ARM Southern Great Plains Site. *J. of Climate*, 20, 4572-4585.

PARTICIPANTS

NCAR – CAM3, National Center for Atmospheric Research
NCAR - dilute – CAM3 convection with parcel dilution (Neale and Richter)
JMA -- Numerical Prediction Division, Japan Meteorological Agency
GFDL – AM2, Geophysical Fluid Dynamics Laboratory
ECPC – Experimental Climate Prediction Center,
Scripps Institution of Oceanography, UCSD
HadGEM1a – Met Office Hadley Center climate configuration
(HadGEM2-A)
UKMO-PS15 – Met Office NWP configuration (UKMO-G44)

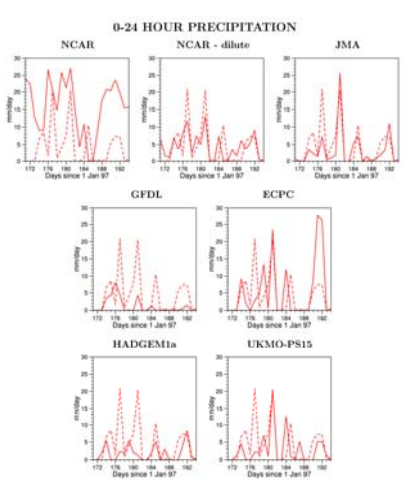
Forecast periods:

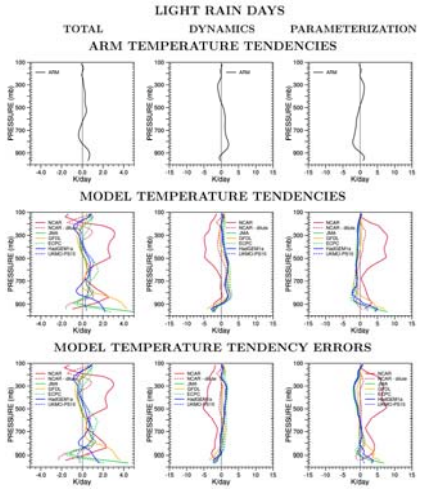
1-22 March 2000 ARM IOP
SCM case of GCSS Working Group 3 (Layered WG)

16 June - 17 July 1997 ARM IOP
SCM case of GCSS Working Group 4 (Deep WG)

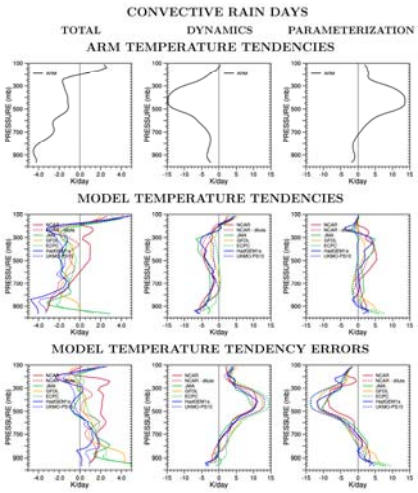
5 day forecasts from 00Z, initialized from ERA40 on native grid

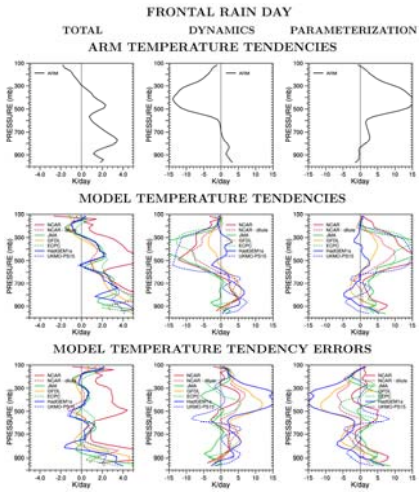
1997 IOP for forecasts initialized from ERA-40 data. ARM observations and the ARM variational analysis are used for verification




1997 IOP for forecasts initialized from ERA-40 data. ARM observations and the ARM variational analysis are used for verification



COMMENTS

- General conclusions from intercomparison
  - Large spread in model behavior.
  - Parameterization heating too strong in several models.
  - Compensated by too strong dynamical cooling.
  - Too large total heating near surface.

- Goals of model intercomparsons are to identify common and unique model errors and to spawn research into their causes.

- Additional hypothesis driven experiments are needed to understand causes.

- Although climate is the average over all phenomena, parameterization errors need to be studied averaged over single phenomenon to avoid cancellation effects.