

WGNE'S APE

Aqua-Planet Experiment

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CHIEF PRIMATES

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PURPOSE

- Provide benchmark of current model behavior
- Stimulate research to understand the cause of differences arising from
 - different models
 - different parameterization suites
 - different dynamical cores
 - different methods of coupling

http://www.met.reading.ac.uk/~mike/APE/ape_home.html

Neale, R.B. and B.J.Hoskins, 2000a: A standard test for AGCMs including their physical parameterizations. I: The proposal. Atmos. Sci. Lett, Vol.1, No.2, pp. 101-107.

Specified global sea surface temperatures

5 zonally symmetric (spanning a range of tropical climates)

3 zonally asymmetric (local and global scale anomalies)

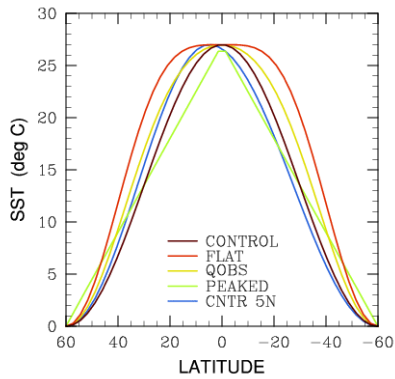
Atmospheric model with complete parameterization suite

Idealized surface

no land (or mountains), no sea ice

specified SST everywhere

simple geometry



FIRST APE WORKSHOP

20-22 April 2005

University of Reading

Discuss Results

Summarize Current Model Behavior

Produce Summary of Research Questions

All data are now in the APE data base at Reading
and quality controlled

Comparative analyses is underway

Second (last) APE Workshop
13 – 15 November 2007
Chiba Institute for Science, Choshi, Chiba, Japan

Discuss Results
Summarize Current Model Behavior
Produce Summary of Research Questions
(Workshop Report not yet available)

POINTS BROUGHT OUT IN THE APE WORKSHOPS

APE is useful to test model changes
help understand how models work
establish sensitivities
help understand about the coupling
of parameterizations and dynamics

BUT cannot conclude if a change is beneficial
need to run full model to see if it has same signal

System is still very complex
even though constrained by a simple surface

Physical system remains very difficult to understand

Caution is required

- avoid over simplistic deductions
 - especially when changing single parameterizations as opposed to entire suites of parameterizations (CAUTION against plug-and-play)
- however can be used to examine mechanisms and how components interact
- wide range of behaviors among models and with resolution and parameter changes
- possibly because not near a convergent regime
 - much more resolution work is required

PLANS FOR DIAGNOSTICS AND PAPERS

All categories will "catalog" model simulation characteristics
leaders have been identified for each category

Basic intercomparison diagnostics

(highlighting areas of agreement and spread)

- global budgets (energy, clouds)
- hydrological cycle
- model spread for mean state in control / qobs
- mean state response to meridional SST profile

Tropical variability

- diurnal cycle
- tropical wave activity

Response to SST anomalies

(understanding the zonally asymmetric behaviour)

OTHER PLANS

APE Atlas is in preparation

- Williamson and Blackburn assembling
- electronic technical report only
- time scale for availability by late winter (early 2009)

JMSJ Special Issue is Planned

- Editor has yet to be announced
- Papers received for review by end of January 2009
- Issue will appear in 2009

DIAGNOSTICS EXAMPLES

Zonal mean state and meridional transports
(comparison with theoretical models)

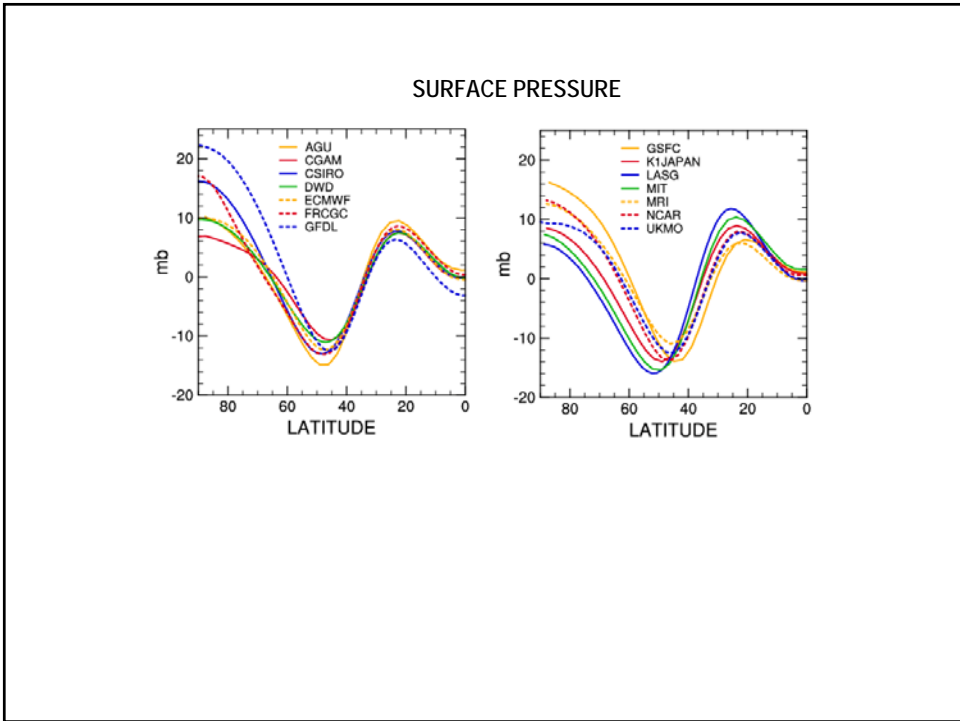
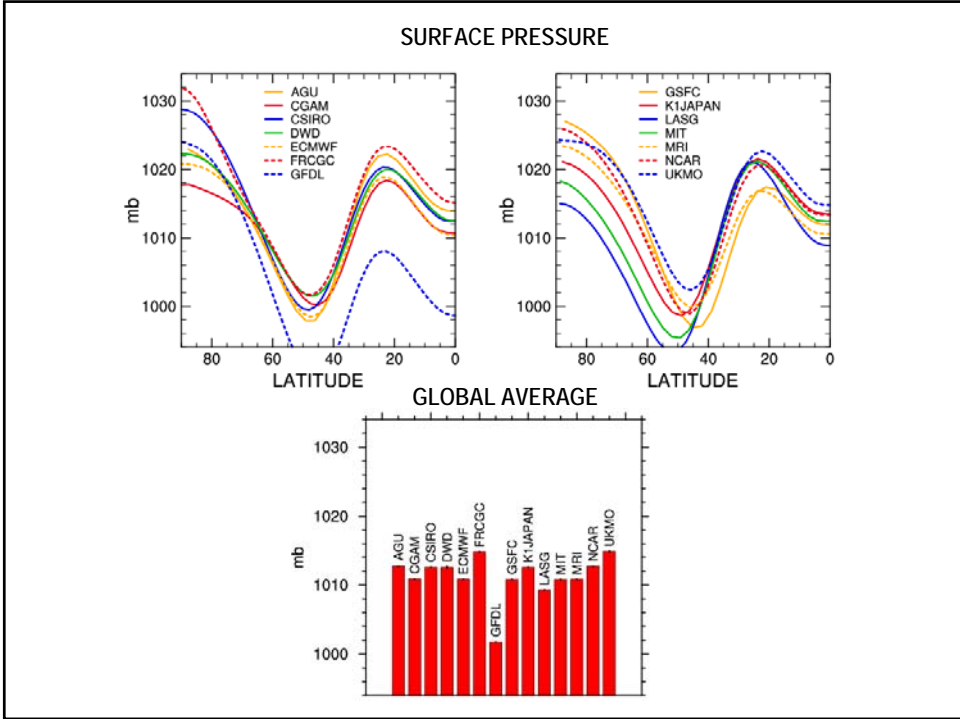
Mid-latitude variability

- low frequency modes
- storm-track transients

Resolution sensitivity and convergence
(studied in only one or two individual models)

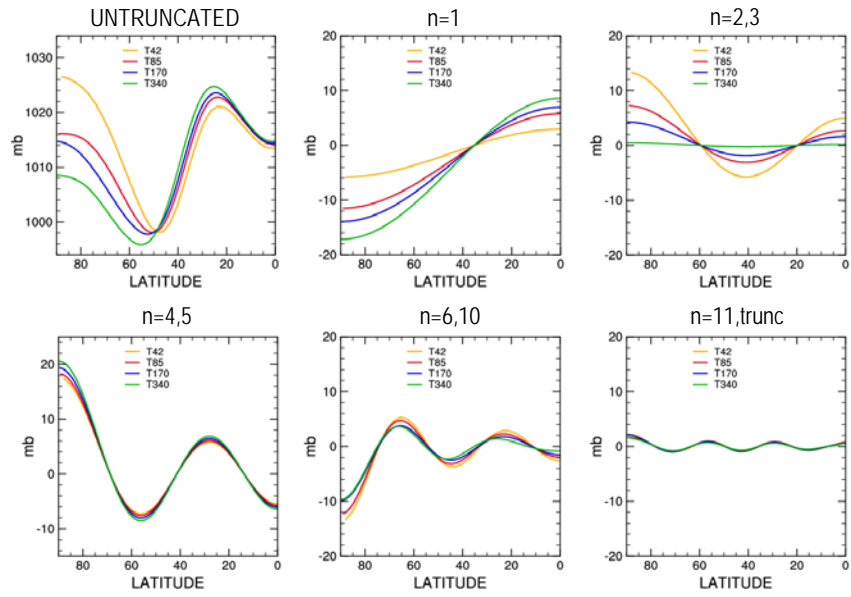
Tropical Transient Structures

diagnose vertical structures of primary tropical propagating features in each model
(required 100 day rerun with additional diagnostics)

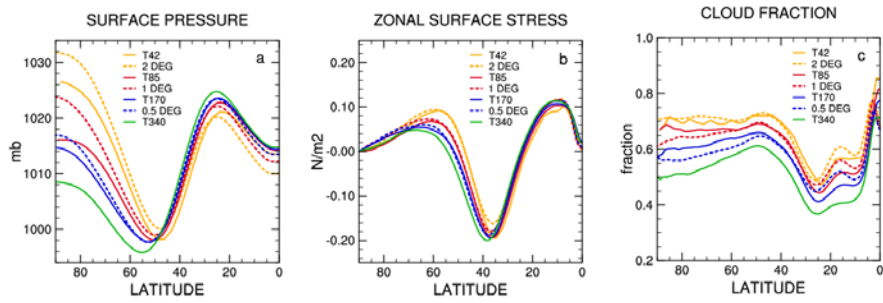


SURFACE PRESSURE

NCAR MODEL



NCAR MODEL



CLOUD FRACTION

