NCAR

Low resolution CAM

-Preliminary results & future plans
(from AMWG February 2008)

Peter Hjort Lauritzen

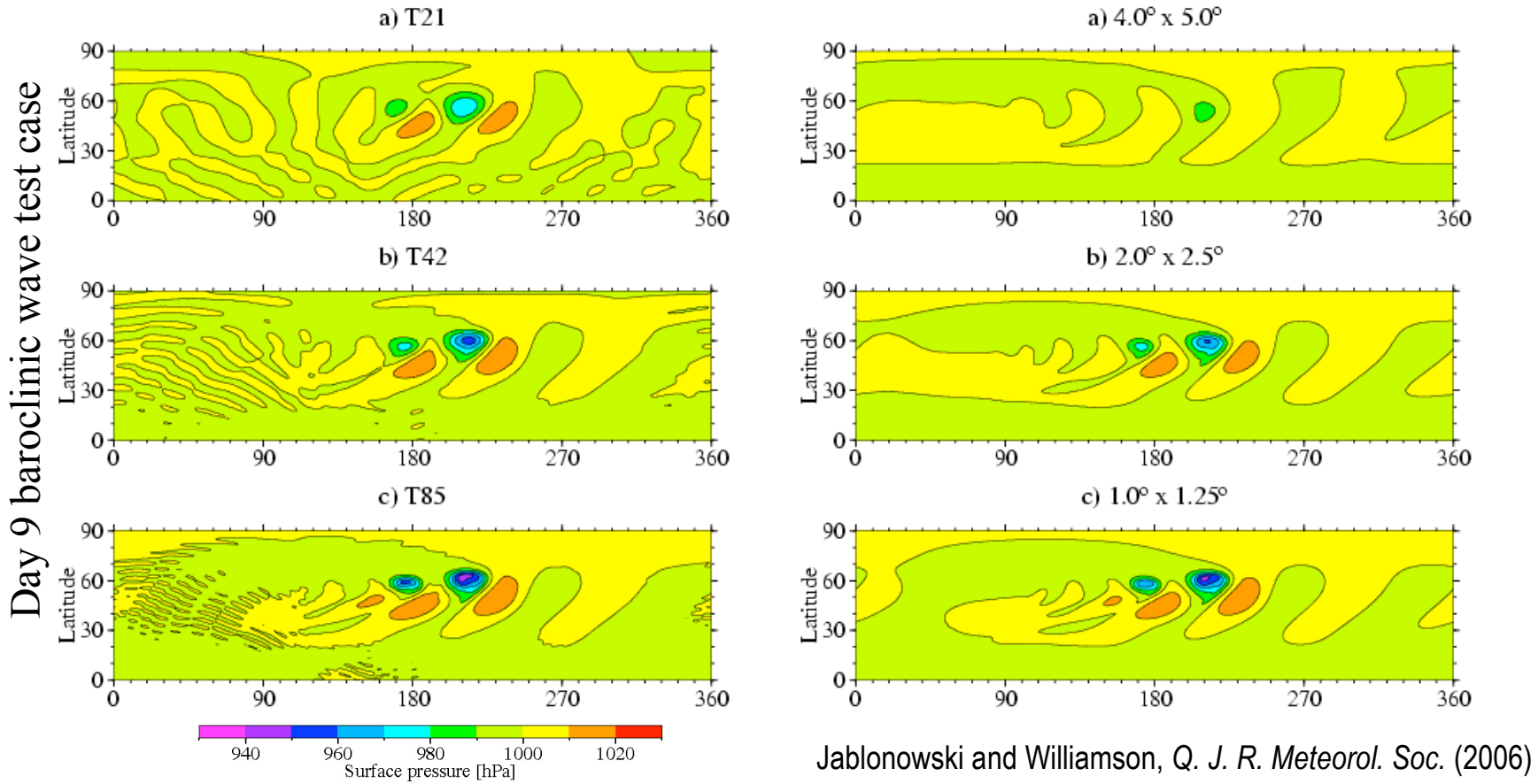
NCAR

NCAR

In idealized tests (adiabatic baroclinic wave and aquaplanet with physics)

-EUL-T85 is equivalent to FV-1.0x1.25
-EUL-T42 is equivalent to FV-2.0x2.50
-EUL-T21 is NOT equivalent to FV-4.0x5.0

Williamson (2008)

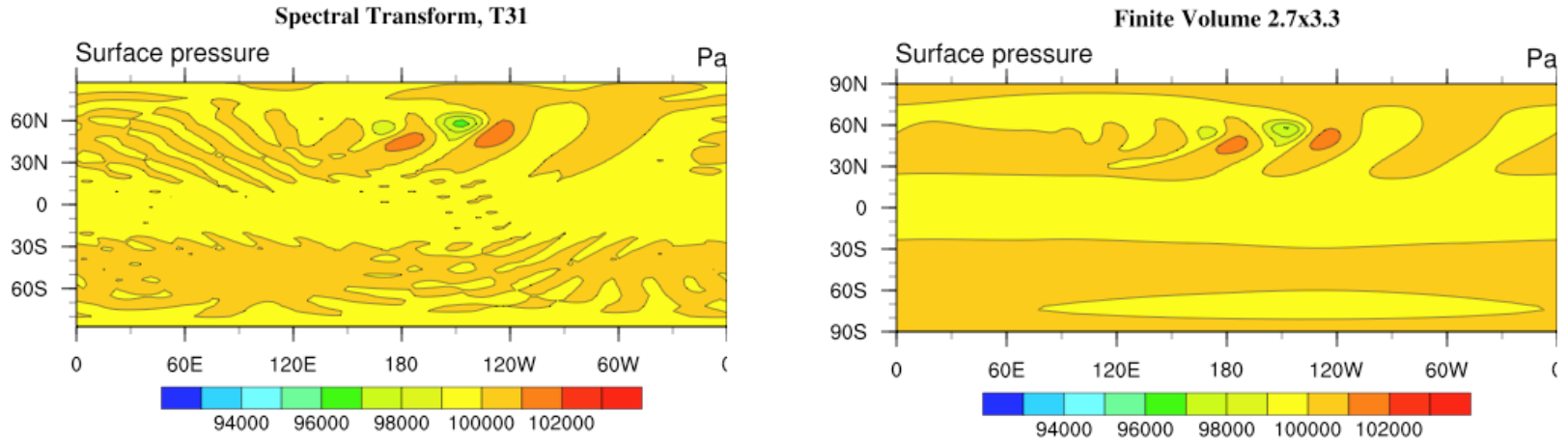


Jablonowski and Williamson, *Q. J. R. Meteorol. Soc.* (2006)

NCAR

EUL-T31 dynamical core is currently used for low resolution CCSM applications

Is there a FV resolution that is equivalent to EUL-T31?



Day 9 baroclinic wave test case

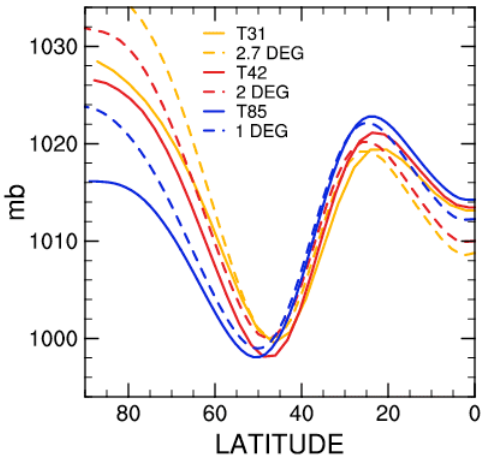
Aqua-planet simulations (Neale & Hoskins, 2000)

NCAR

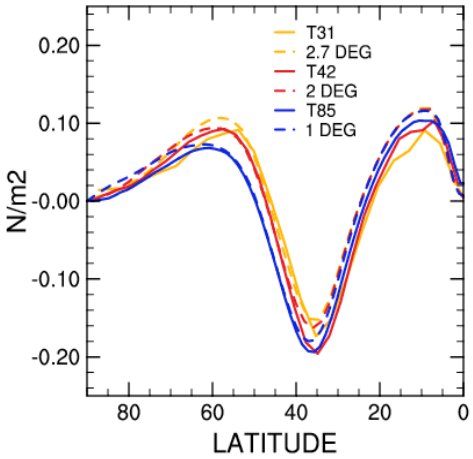
Time average, zonal average for PS and surface stress

Time average, global average

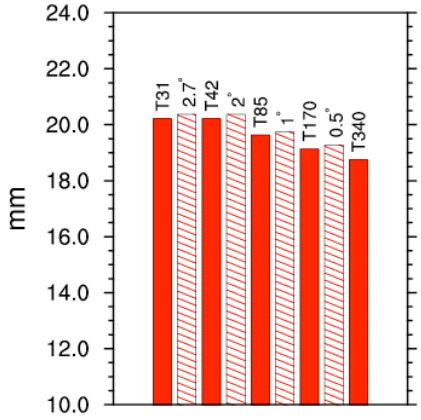
SURFACE PRESSURE



ZONAL SURFACE STRESS

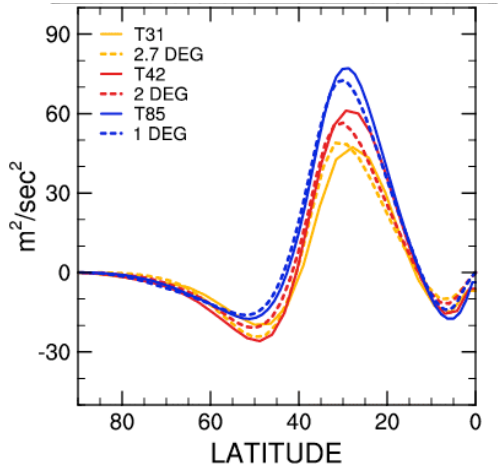


PRECIPITABLE WATER



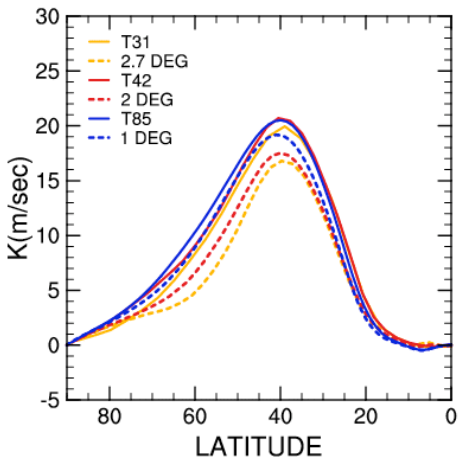
Zonal average meridional eddy statistics

$\overline{(v'u')}_{200mb}$



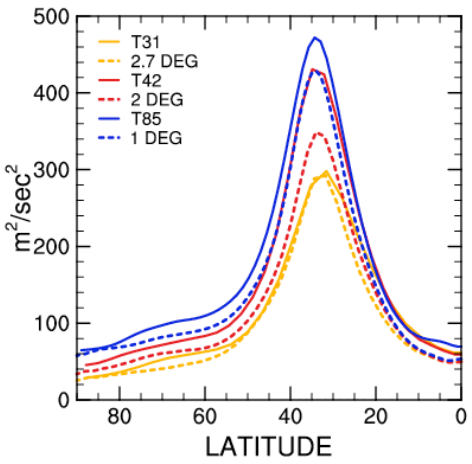
Meridional eddy momentum flux

$\overline{(v'T')}_{800mb}$



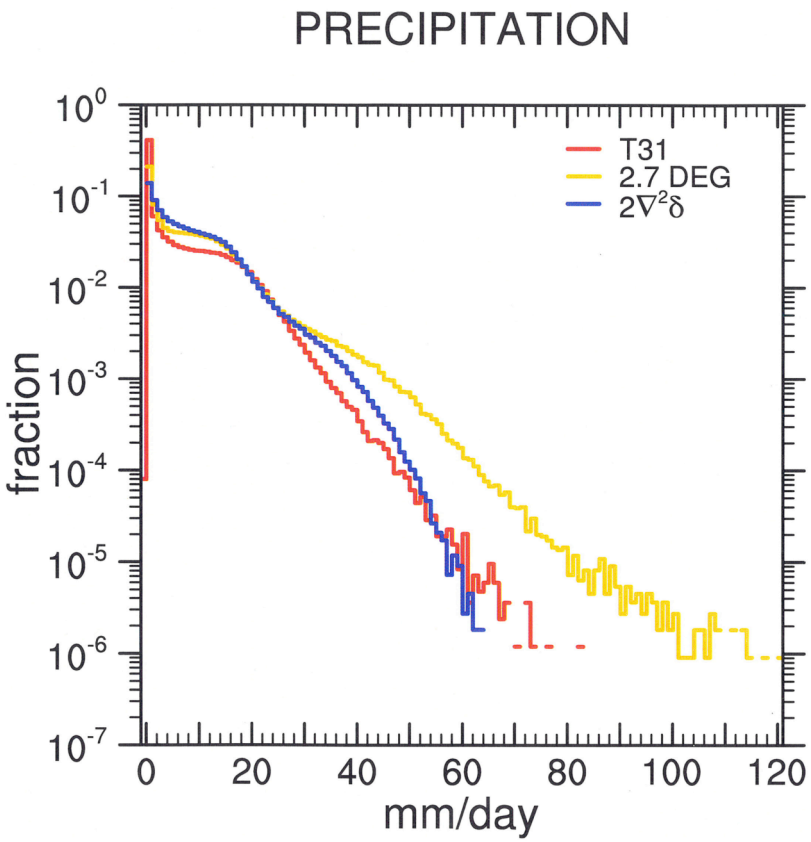
Meridional eddy heat flux

$0.5\,\overline{[(u')^2 + (v')^2]}_{200mb}$



Eddy kinetic energy

“Tweak” for low resolution CAM



Fraction of time precipitation is in 1 mm/day bins ranging from

0 to 120 mm d−1

Doubling the divergence damping coefficients reduced the variability to T31 levels

Efficiency

Standalone CAM using 3.5 physics (not idealized)

- FV-2.7x3.3 is approximately 55% more expensive than EUL-T31
- FV-2.7x3.3 is approximately 54% less expensive than FV1.9x2.5.

Settings

FV-2.7x3.3 : dt = 30 min. (10 min. dynamics dt)
FV-1.9x2.5 : dt = 30 min. (7.5 min. dynamics dt)
EUL-T31 : dt = 30 min.

Default IO settings, 30 day run on one node on Bluevista

Plans

- CCSM: T31 atmosphere (spectral transform dynamical core) and 3 degree ocean version exists and works “well”.
- Will attempt to assemble low resolution CCSM model with the finite-volume dynamical core for the atmosphere using track 1 physics (CAM3.5+).

  Timeline: Fall 2009