

Initial APE CAM 3.1 physics - HOMME dycore

Model Details

- All Runs:
 - CAM_3_4_10 (same physics as CAM 3.1)
 - Eulerian T85 physics tunings
 - 14 month runs, initialized from an earlier APE run
 - plots are time averaged over last 12 months
- Eulerian dycore
 - namelists: [atm in drv in](#)
 - Branch: https://svn-ccsm-models.cgd.ucar.edu/cam1/trunk_tags/cam3_4_10
 - T85: build CAM with `./configure -dyn eul -hgrid 128x256 -spsmd -nosmp [...other platform dependent options]`
 - Dynamics timestep 2.5m
 - Physics timestep 5m
 - Ozone: symmetric dataset
 - SYPD 2.5 (Thunderbird, 128 cpus, 5m physics timestep)
 - SYPD 6.3 (Thunderbird, 128 cpus, 20m physics timestep)
 - This is an attempt to match one of the runs in Williamson, "Convergence of aqua planet simulations with increasing resolution in the Community Atmospheric Model, Version 3", Tellus, under review.
 - Dry air mass held constant at 10307.8 kg/m²
 - time averaged globally averaged statistics:
 - PRECC = 1.59
 - PRECL = 1.39
 - CLDTOT = .598
 - TMQ = 19.6
- HOMME dycore
 - Branch: https://svn-ccsm-models.cgd.ucar.edu/cam1/branches/homme_cam3_4_10/
 - build CAM with `./configure -dyn homme -hgrid ne21np4 -spsmd -nosmp [...other platform dependent options]`
 - on systems using openMPI, may need: `-fflags "-DNO_MPIINPLACE"`
 - namelists: [atm in homme drv in homme](#) (rename atm_in, drv_in)
 - Spectral Elements (mass and energy conserving formulation)
 - Postive preserving advection
 - mass weighted ?4 hyperviscosity.
 - ?? viscosity on top 3 levels. del2=2.5e5
 - 4th order elements. NE=16, 30, 60
 - SYPD: 8.4 (Thunderbird, 200 cpus, with 4m physics timestep)
 - SYPD: 13.4 (Thunderbird, 200 cpus, with 20m physics timestep)
 - Dry mass exactly conserved 10307.1 kg/m².
 - No dry mass/energy fixer. E= .2579e10 - .2575e10
 - Ozone: symmetric dataset

Global averages from CAM/HOMME and CAM/EUL. Eulerian results from Williamson, "Convergence of aqua planet simulations with increasing resolution in the Community Atmospheric Model, Version 3", Tellus, under review 2007, and Williamson, "Equivalent Finite Volume and Spectral Transform Horizontal Resolutions Established for Aqua-planet Simulations", Tellus, under review 2007.

Legend:

- PRECC: precip (mm/day) from convection
- PRECL: large scale precip (mm/day)
- CLDTOT: total cloud fraction %
- TMQ: precipitable water (mm)

Resolution	physics dt	del^4	PREC C	PREC L	CLD TO T	TMQ
EUL T42	5m	1e16	1.71	1.11	0.65	20.21
HOMME 1.9	5m	1e16	1.76	1.14	0.66	20.09
EUL T85	5m	1e15	1.59	1.38	0.60	19.63
HOMME 1.0	5m	1e15	1.59	1.43	0.61	19.67
EUL T170	5m	1.5 e14	1.44	1.62	0.55	19.13
HOMME 0.5	5.5m	1.5 e14	1.48	1.62	0.55	19.36
EUL T340	5m	1.5 e13	1.36	1.75	0.50	18.75

Link to KE Spectra: [APE KE Spectra](#)

Link to precip PDFs: [APE Precip PDFs](#)

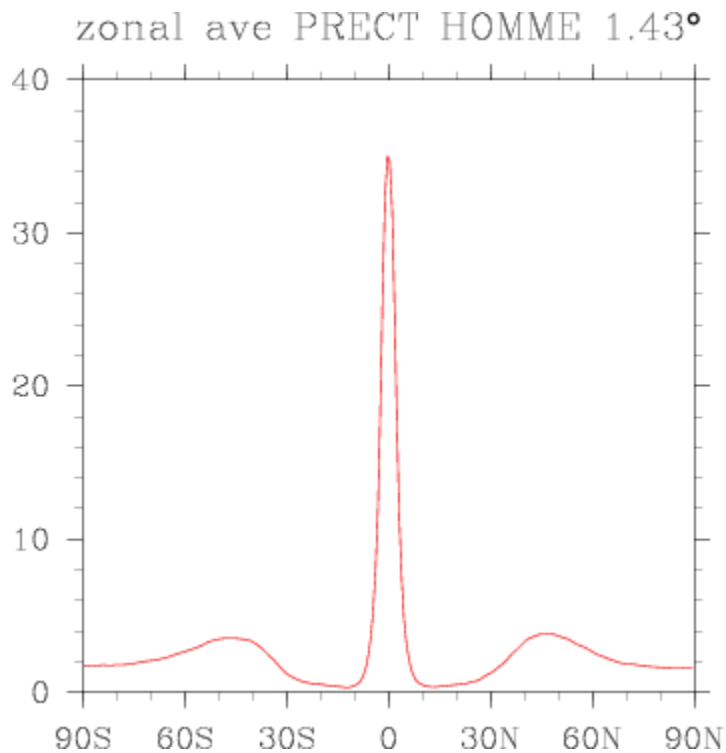
[Wheeler-Kiladiaz Wavenumber-Frequency plots of precipitation](#)

Link to zonal plots of Q, CLDICE, CLDLIQ and forcings: [APE Tracer and Tracer Tendency Results](#)

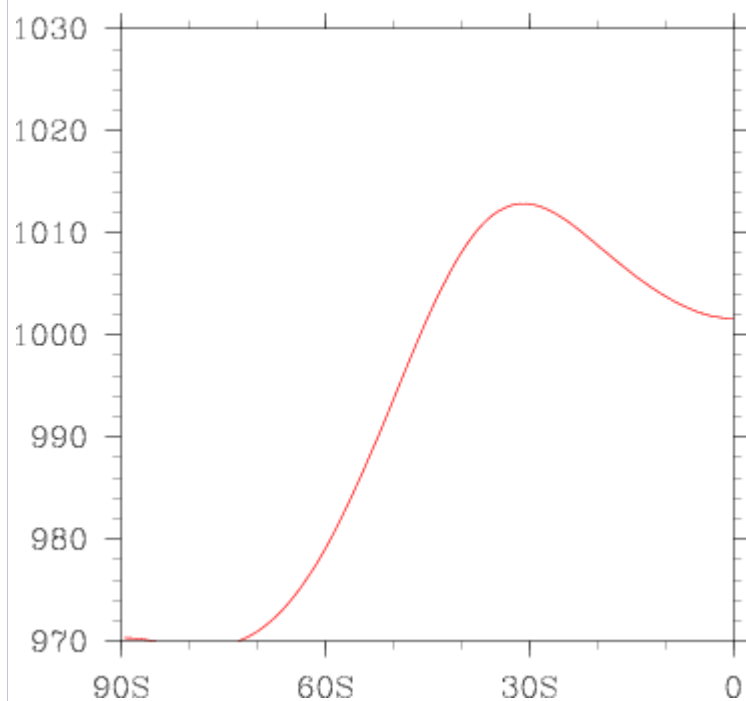
Time averaged, zonally averaged precipitation and cloud plots

Legend for zonally averaged plots

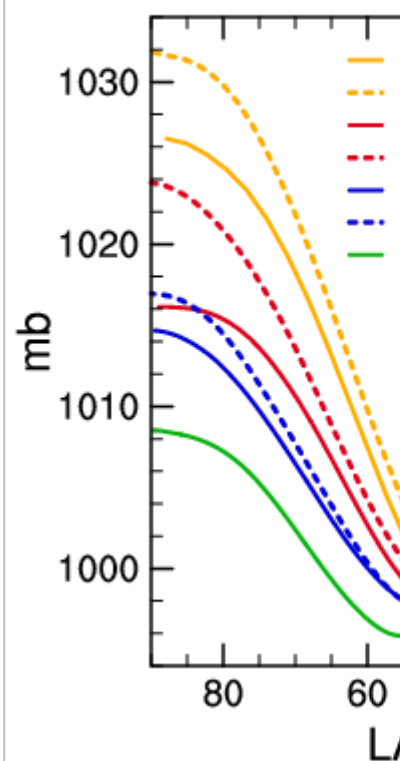
- HOMME (left column)
 - ORANGE: HOMME 1.9 degree NE=16
 - RED: HOMME 1.0 degree NE=30
 - BLUE: HOMME 0.5 degree NE=60
- EUL and FV (right column). Images from Williamson, "Equivalent Global Atmospheric Model Resolutions Established Via Aqua-Planet Experiments", PDES on the Sphere 2007, <http://www.metoffice.gov.uk/conference/pdes2007/>



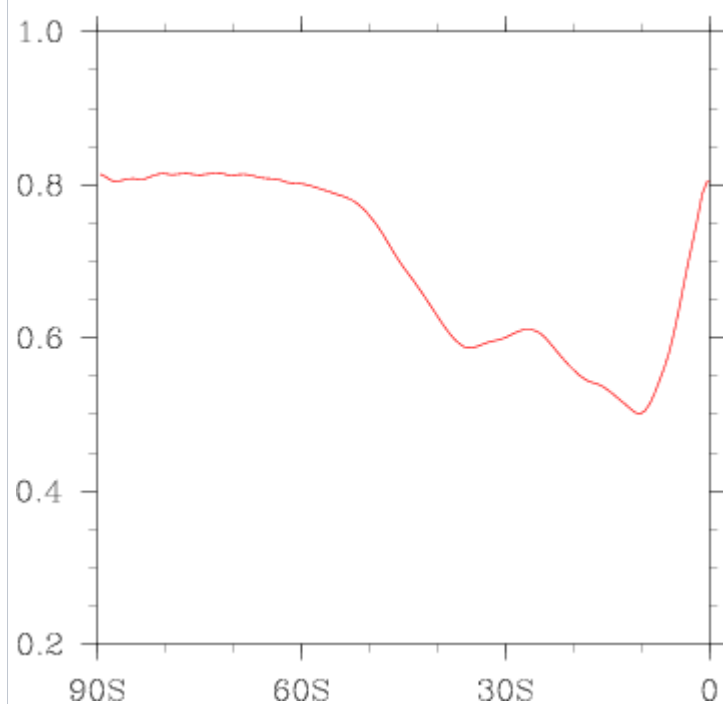
zonal ave PS HOMME 1.43°



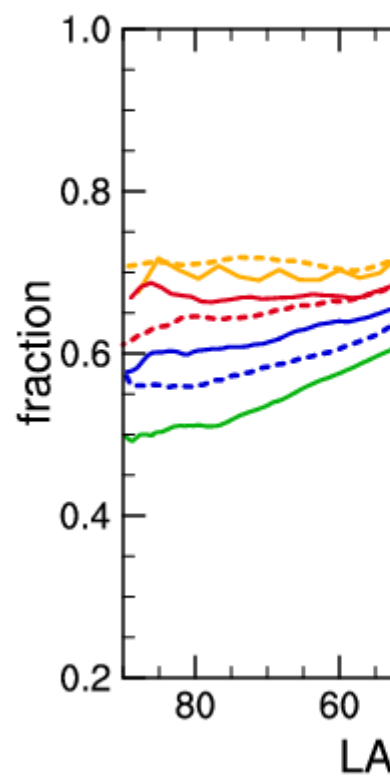
SURFACE

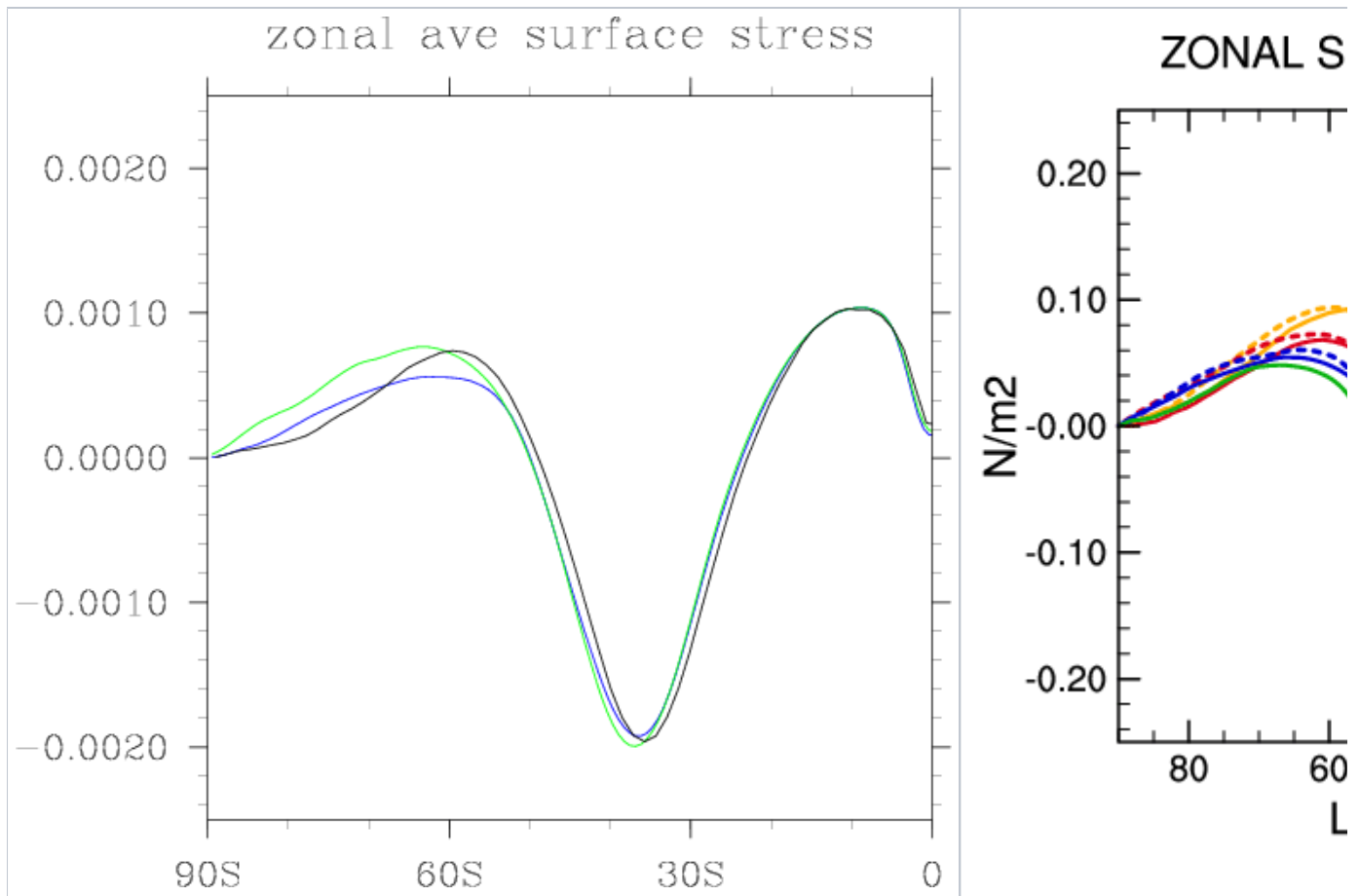


zonal ave CLDTOT HOMME 1.43°

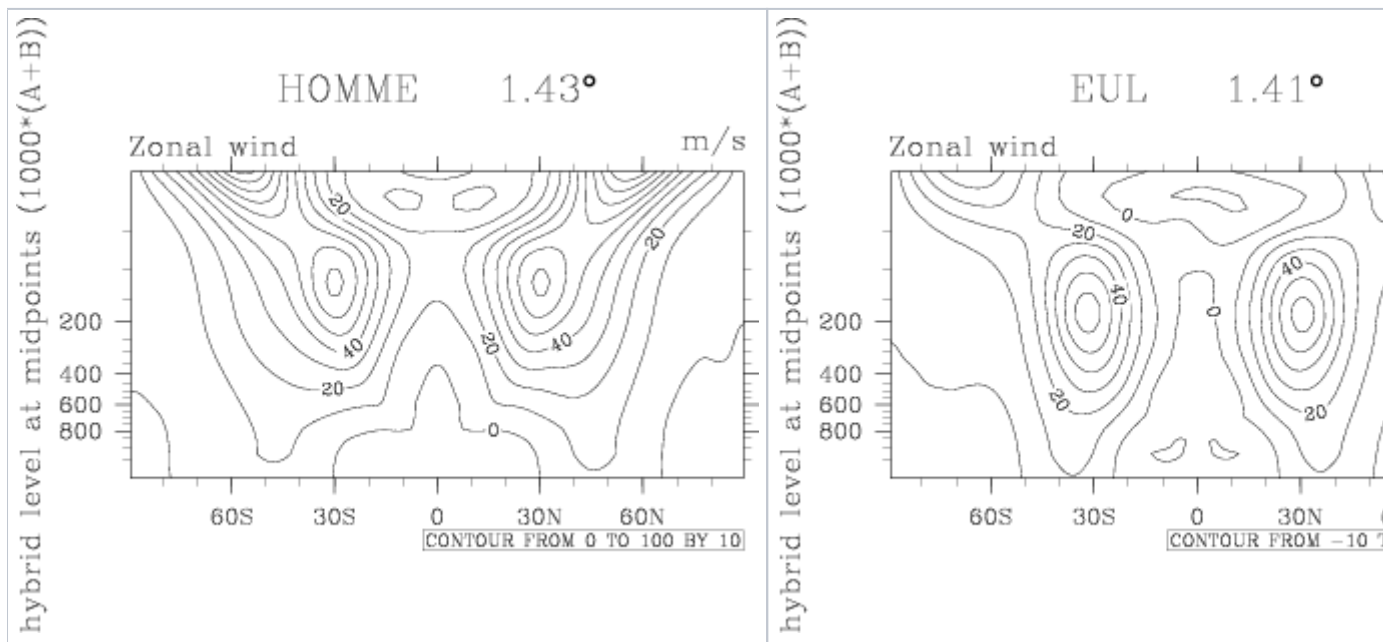


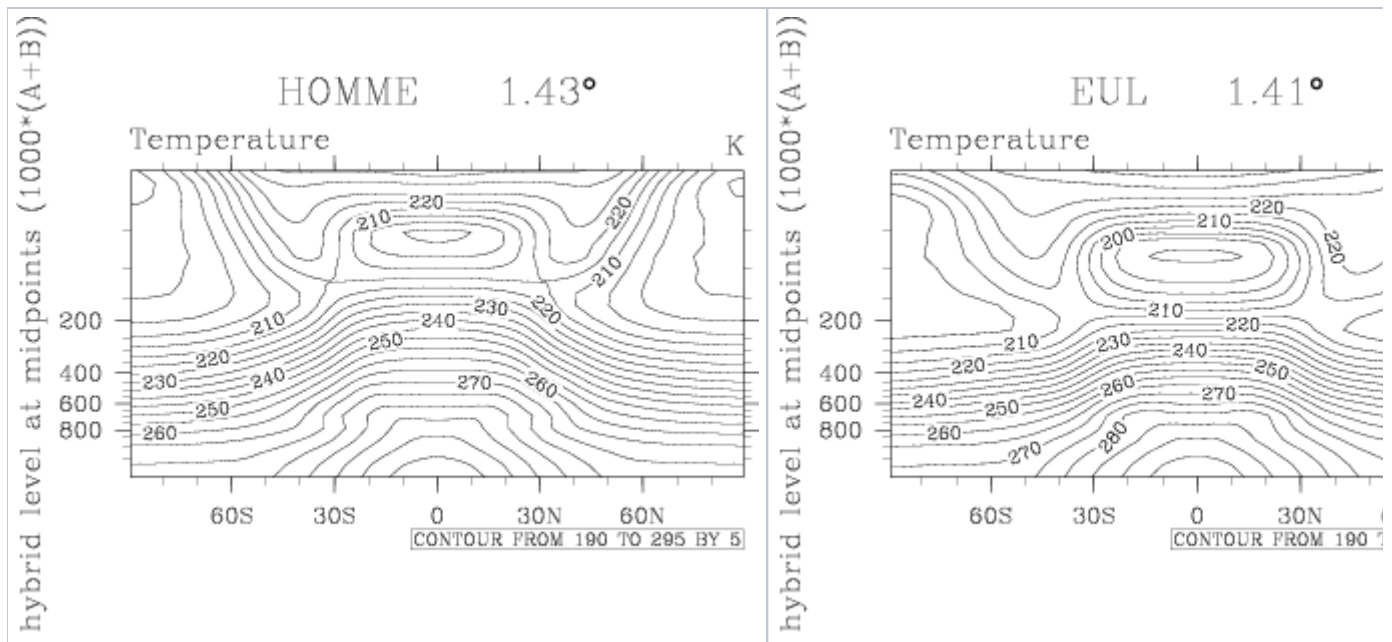
CLOUD



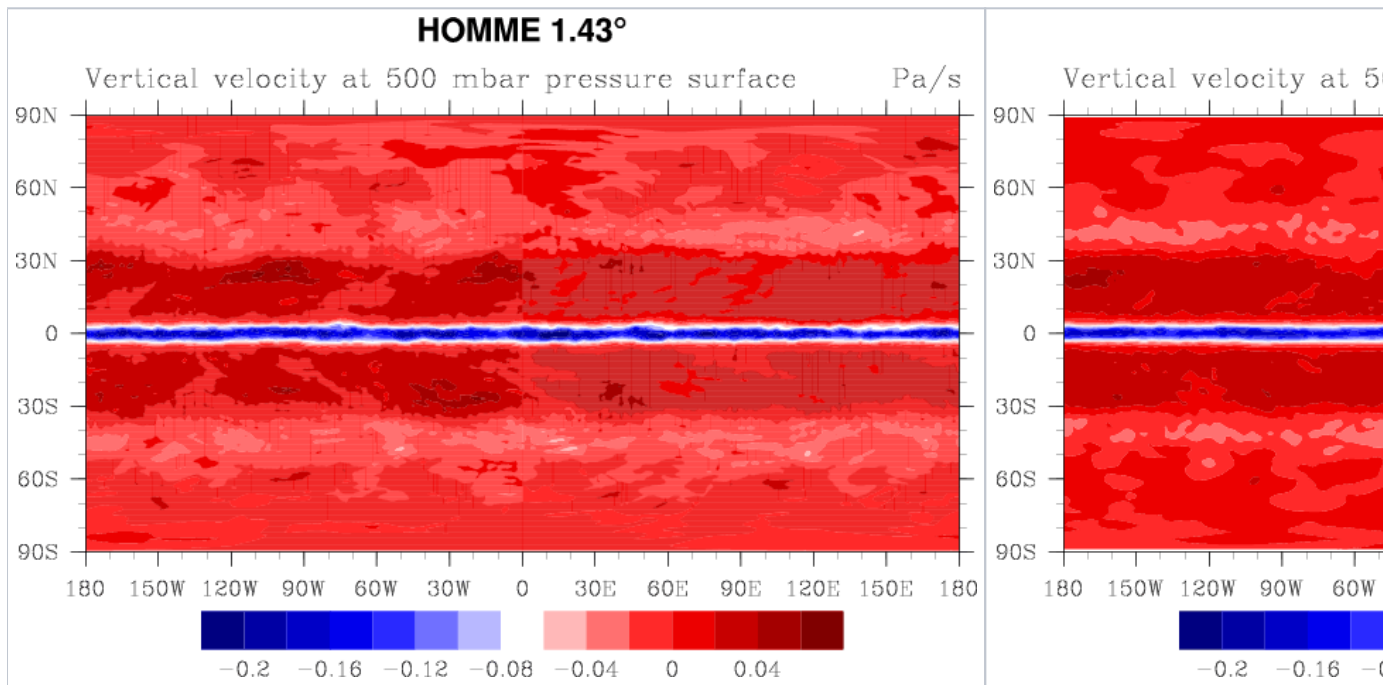


time averaged zonally averaged fields:





OMEGA500: time averaged vertical velocity at 500 MB



time averaged total cloud

HOMME 1.43°

