

Atm Group Highlight

(Phil for the group)

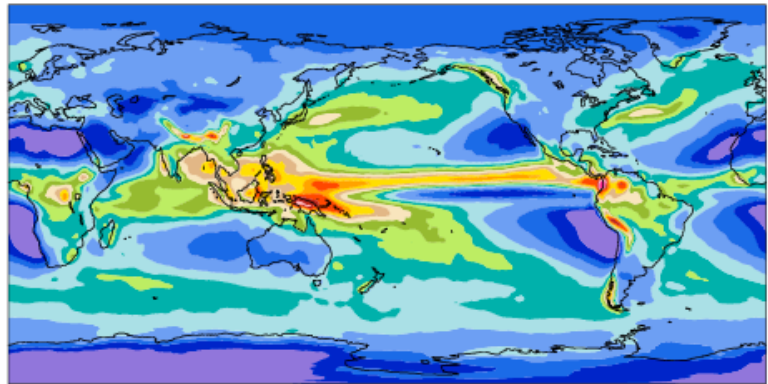
Progress on Model

- Atmosphere model configuration that we believe suitable for coupling provided mid July (AV1C-04)
- Worked with coupled team to evaluate it through various forcing datasets (PI, PD,...) for “effective forcing”, and basic climate
- Noted biases
 - High-latitude DJF climate, model is too warm near the surface
 - Upper tropospheric warm bias in the high latitude,
 - Too little marine stratocumulus, and too much trade cumulus,
 - In the southern hemisphere, the implied ocean heat transport is pretty far off,
 - JJA tropical precipitation

Two tracks (same codebase) are active

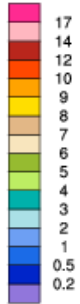
- Discussed with EC and Coupled team in August
 - The submitted track being used for coupling (AV1C-04)
 - The exploratory track (ap15 and descendants)

ap15 (yrs 1-5)
Precipitation rate mean= 2.87 mm/day

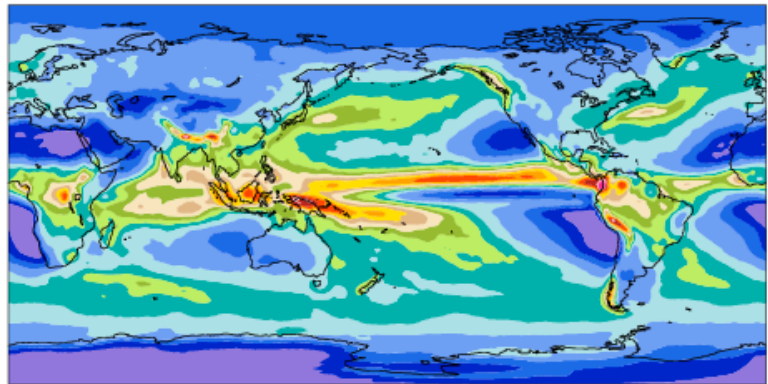


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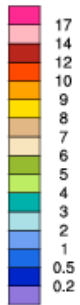
Min = 0.01 Max = 22.65



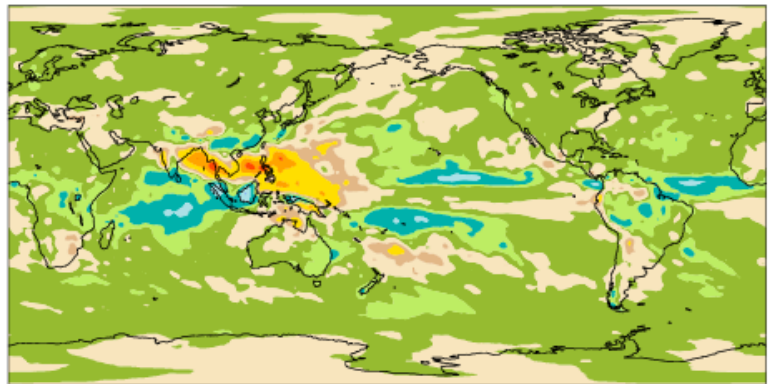
ap00 (yrs 1-5)
Precipitation rate mean= 3.05 mm/day



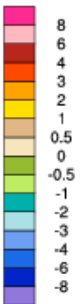
Min = 0.00 Max = 23.56



ap15 - ap00
mean = -0.18 rmse = 0.56 mm/day

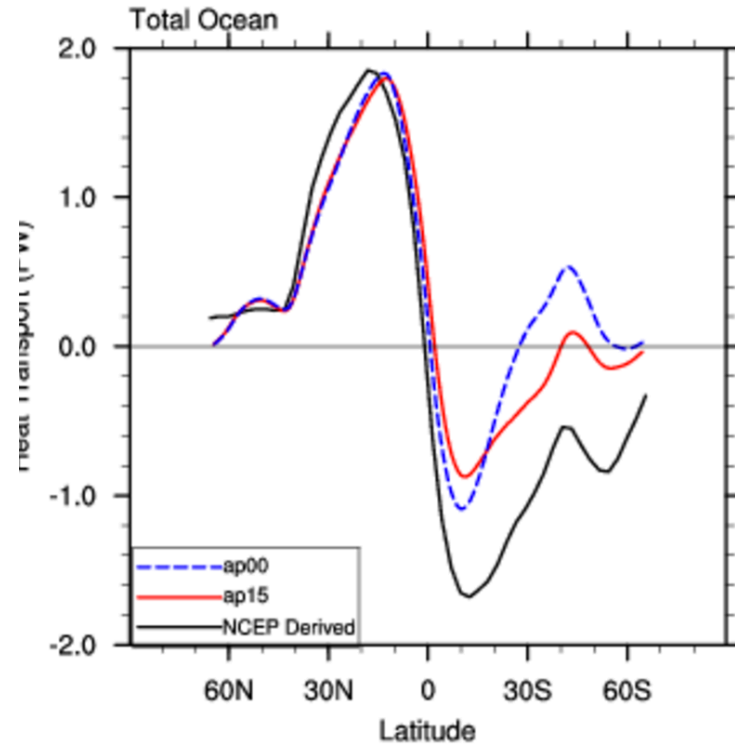


Min = -3.07 Max = 3.90



Aug/Sept 2016: adding Gustiness
Trying to address Precip and surface flux biases

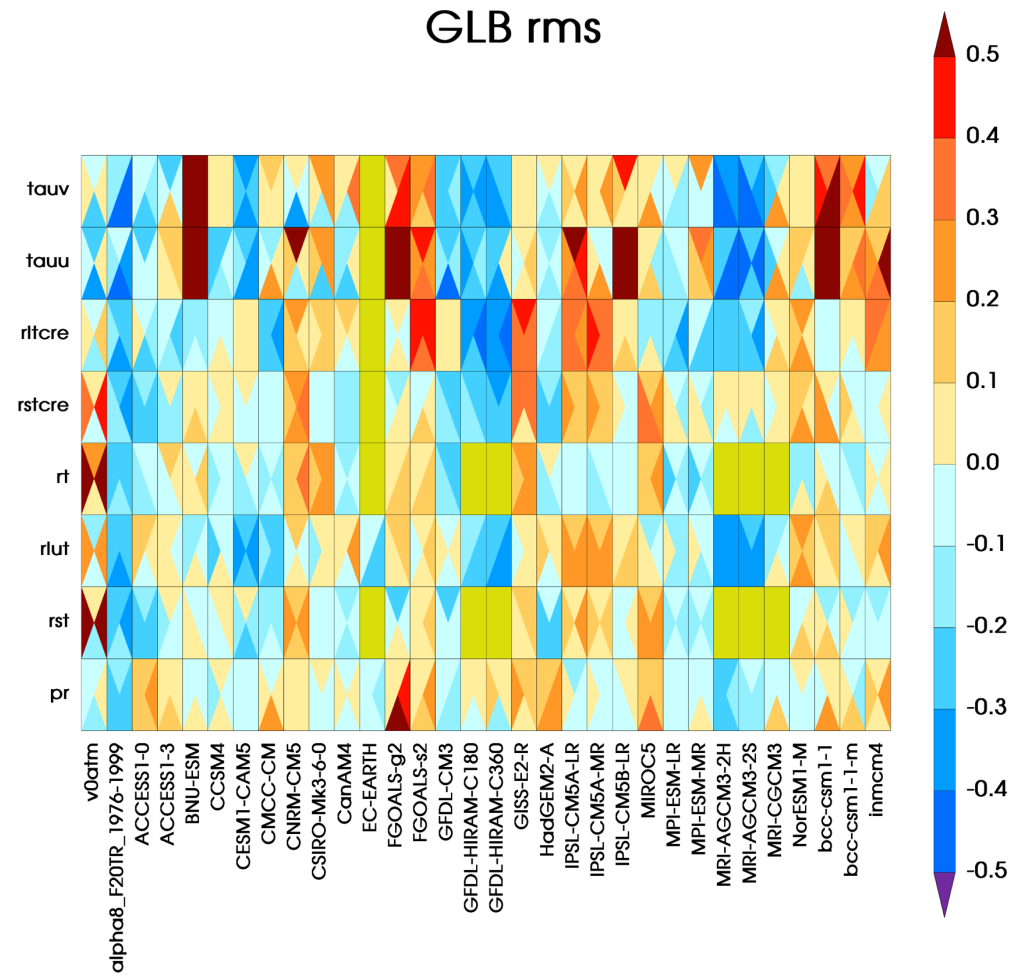
Annual Implied Northward C



Tradeoffs:

1. Degradation in Water Vapor
2. Degradation in Cloud Forcing

V0 vs V1AC-04



Learning experiences from coupled/atm team activities (Sept/Oct)

- Problems found with water conservation
 - Small errors in flux exchanges
 - “positivity fixers” exacerbate conservation errors with higher vertical resolution
 - Choice of atmospheric dynamics/physics time step coupling strategies lead to conservation errors exacerbated by higher vertical resolution
- Model stability
 - RRTMG errors (known in CESM, on our radar, but other issues had higher priority)
- Fixes were committed to master rapidly

About 10 days ago:

- Bug was found in cloud microphysics
 - A parameter change introduced to reduce the aerosol indirect effect that should have appeared in two places in the code was only implemented in one place
 - correction caused significant change to climate
 - a second change brought climate partway back to decent climate
- First discovery was in track with “gustiness on”. Problem is present in standard and experimental track.
 - ***A fix is required very rapidly.***
 - Exploring how the bug manifested itself revealed another problem in CLUBB/MG2 formulation.
 - an important microphysical property is out of range of desired values
- Solution:
 - Move back to “standard track”
 - Fix the microphysics bug, retune so climate is again OK
 - Figure out how to deal with the CLUBB/MG2 inconsistency
 - Live with it
 - Fix it

Other interesting stuff

- 11 Papers in prep or submitted
- 10 Posters in poster session
 - [#A01 Aerosols in v1-beta](#)
 - [#A02 Climate sensitivity to marine organic aerosol emissions in ACME v0](#)
 - [#A03 Parametric sensitivity and optimization in ACME-V1 atmosphere](#)
 - [#A04 High-Resolution Tuning](#)
 - [#A05 Prototype Workflow for Tuning ACME with RRM](#)
 - [#A06 Identifying and fixing water conservation errors in the ACME atmosphere model](#)
 - [#A07 Cloud Evaluation using simulators](#)
 - [#A08 Convective Drizzle in ACME v1 Atmosphere](#)
 - [#A09 OrographicPrecip](#)
 - [#A10 Gustiness and monsoons in v1](#)