

Notes from AMWG Panel Discussion – Feb 19, 2015 (by Rich Neale)

Jean-Francois; Big thanks to the CLUBB and UNICON speakers.

Mitch: Not a good time to move physics schemes as organized convection (MCSs, MJO, US precip.) not well represented. This will not be improved in 6 months probably.

Vince: CLUBB can't do spatial structure it only has PDFs, Organization important (based on turbulent timescale), but moments can be propagated.

Sungsu: Mapes and Neale (2008) organization ideas are in UNICON. And there are T,q,u,v fields related to this in the scheme. However, this did not improve US MCSs. Not sure what could fix this.

Mitch: MJO is related to inherent instabilities on synoptic to large scales.

Vince; CLUBB prognosing turbulence shallow->deep from growing turbulent eddies.

Phillip: Chemical tracer transport validation has not been done well yet, but there are good observations to exploit.

Sungsu: No chem. simulations yet but have looked at aerosol. It is improved in comparison to CAM5. Does not handle cloud borne aerosol.

Joe: Thanks to speakers again. We should not expect propagation mechanisms, since GW excitation not possible in the models. Suggest that panel's recommendation for going forward is the best option. Encourage the developers to rectify parts of simulations consistent with recommendation.

Minghua: We will clearly need to assess again at the appropriate time.

Phil R: One missing aspect in the talks was any reference to latent/sensible heat fluxes. There is a 5W difference in the partitioning in the two schemes. There are also concerns for the precipitable water distribution (low in CLUBB) for both AMIP and CLUBB simulations.

Sungsu: there are ENSO differences in simulations. He did provide two sets of simulations, where one was better. Also 2 deg. ENSO was much better. The reason? CMT? Changing two parameters decreased amplitude. It is not known why. The MJO diurnal cycle is robust, but ENSO is not. Cloud micro-physics parameterization interactions seem to be the reason. Single column has shown that there is too much drying in the PBL due to too little drying from downdrafts.

John D: What are the computational cost implications and has there been any evaluations? Will figure out optimizations later.

Thomas T.: An interesting debate. There is a lot of emphasis of evaluation of test runs e.g., ENSO. But there are a lot of dependencies for ENSO. A better way would be more systematic combinations of components.

Rich N: Hard to define better. For what purpose is it better? Not for creating a climate model for CMIP6 in 6 months.

Kevin T: MCSs missing is a sever deficiency. Yaga showed increasing vertical resolution, gives a more realistic wave spectra with increased DOF for convection.

Phil R: Vince and Sungsu have made honest attempts to include the right phenomena. But we need a larger community of people to look at the schemes. Which means we could wait forever to choose a scheme.

Ahmed: We need to know what fits better in the whole of CESM and plays nicely so that CESM is fit for purpose in MIPs.

Leo: It's a tough time for model building. What does success look like, and what do we do to achieve it? We have a set of practical requirements. Must emphasize that ideas are not going to be shelved. It requires a balance of everything. A little strange that ENSO is at the top of the list of requirements. This is all science in action!

JF: Great points all. What we need to consider is are the models in a viable state right now? ENSO was looked at because of this. We really wanted to see how these changes in the future. The possibilities of combining efforts still remain. Thanks everyone.

Sungsu: From a scientific pint of view CLUBB simulates stratus. UNICON just does cumulus turbulence so there issues with combining the two. Are there any ways to make it scale-aware? Its is a unimodal versus bimodal framework.

Vince: Agrees with Sungs.

Andrew; It sounds like an EDMF approach in order to combine aspects of the two.

Judith: We have to consider next generation physic for use in non-hydrostatic dynamical cores.

Vince: CLUBB as been extensively tested in SAM, and also shows good clouds in MMF frameworks.

Sungsu: UNICON does sub-grid vertical transport, it does not simulate convection as a phenomenon specifically. CLUBB is more generalized than EDMF. Combining CLUBB with UNICON difficult.

Vince: The information from the panel was very useful. We should consider having both the models available, even though it has not been the way of working in previous versions of CAM.

Phil: Recall that the CAM4/CAM5 process was crazy.

Jim E.: We have to consider good code re-use. CAM3/4/5 is not bad at doing that.

Thomas T: It is good to keep code of many models for users.

Leo: It is only do configurations rather than full supported versions.

JF: Have to consider that this process goes beyond CMIP6. All model versions that supported have to be really well tested, including interactions with other components. However, resources are limited for this.

Minghua: FV cubed may still be an option for speed up in CAM relative to lat-lon FV. But still has to be tested in coupled mode.