

[2022/02/16 22:45] Tobias Wehr

heating rate uncertainties due to input (retrieval) uncertainties will be included in ACM-RT product (Canada)

[2022/02/16 23:17] Bjorn Stevens (Guest)

Clouds can never be too dull!

laugh 1

[2022/02/16 23:17] Bjorn Stevens (Guest)

:)

[2022/02/16 23:25] Kollias, Pavlos

500 m above the surface

[2022/02/16 23:30] Helene (Invité)

?

[2022/02/16 23:49] Kollias, Pavlos

@Bjorn 👍

[2022/02/16 23:51] Kollias, Pavlos

The sub-column generator needs to get right the vertical structure of condensate because this matters a lot in attenuating wavelengths.

[2022/02/16 23:54] Kollias, Pavlos

The EarthCARE products include sedimentation velocity estimates (no vertical air motion) and this should be something you can compare against the model output without the need to involve the model air motion.

[0:14] Andrew Gettelman (Guest)

Sub-grid does impact the model evolution: sub-grid velocity is important for (A) turbulence and (B) nucleation/activation. Doppler would be worth it. IMHO....

[2022/02/17 0:16] Andrew Gettelman (Guest)

I agree with Bjorn's comments that we should push to comparisons at higher resolution. But Hashino-san's results were very interesting and useful showing what we lose in having to use 'sub-grid' information.

[2022/02/17 0:23] Ming Zhao (Guest)

Vertical velocity of updrafts and/or hydrometeors should be very useful piece of information, I think we just need to be very careful when comparing them with models given many potential mismatches in spatial temporal resolutions and physics assumptions between model and obs.

[2022/02/17 0:38] Andrew Gettelman (Guest)

+1 Ming: simulators are some of the best tools to minimize (harmonize?) physics assumptions between models and observations. Bjorn raised the important spatial-temporal issue too. Going to high resolution and backing off as Hashino-san showed is a way to do that and show the problems Bjorn raised.

[2022/02/17 0:46] Bjorn Stevens (Guest)

I'm mostly concerned that we are trying too hard to match our preconceptions in the space of what the models simulate, rather than asking what is important for the evolution of the simulations and how this is constrained by observables. Of course to understand mismatches in the latter we would like to try to observe the former, but maybe that shouldn't be our first thought.

[2022/02/17 0:49] Muelmenstaedt, Johannes Heinrich Georg

I have to leave at 1600 UTC sharp, so unfortunately I'll probably miss some very stimulating discussion, but here are my 2 ¢ on Bjorn's point that radiation and radiation divergence are what matters for the model evolution. He's right that that's what **the model dynamics** cares about, of course, but what **we** care about is the sensitivity of the radiation to anthropogenic perturbations. If we focus only on getting the radiation right in the

model, I'm worried we'll end up not getting the sensitivities right, because state and sensitivity depend on different processes.

[2022/02/17 0:50] Andrew Gettelman (Guest)

Good point Bjorn. If we think in terms of DA and invert the simulators like Mark is doing: we can use the obs to work in the space of what is important for the evolution of the simulations as you suggest.

[2022/02/17 0:52] Bjorn Stevens (Guest)

Regarding JM's point... I think if we get the radiation and its divergence right, over the globe, we can be pretty confident that we get the derivatives correct as well. That's the nice thing about working globally, we sample such a rich space.

[2022/02/17 0:57] Bodas-Salcedo, Alejandro

Bjorn, that's an interesting point, has that been tested? i.e. is there a correlation between response and present-day in the radiation/divergence space? Not a sufficient condition, but it could help.

[2022/02/17 0:59] Bjorn Stevens (Guest)

ABS ... no, but I think one could map out what sensitivities one constrains by conditioning the analysis, and from that better discriminate what is and what is not constrained by present day variability....

[2022/02/17 1:00] Muelmenstaedt, Johannes Heinrich Georg

That's a distinct possibility. If that's the case, that would solve a big chunk of the climate problem 😊. So the questions would be, (1) how do we demonstrate Bjorn's hypothesis? (I suppose if the DYAMOND models all agree with each other on the state **and** on sensitivity, that would be pretty convincing) and (2) are the radiative heating rates the optimal

observable to constrain to from an observational standpoint, i.e., are there other observables with lower uncertainties?