Working Group 2:
Parameterization aspects of 'convection-resolving' model

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Strong sensitivity to initial time of forecasts (inconsistency between subsequent forecasts):
Predicitability or problem of data assimilation?

What are the biggest problems?

- Boundary layer parameterization (e.g. low level moisture). Needs a lot of tuning and depends on numerical diffusion of the model.
- Treatment of 'grey zone'. Convection scheme that turns itself off in a continuous way yielding a smooth transition to small grid spacing.
- Can we distinguish noise from physically meaningful motion?
- Transition from shallow to deep convection? Shallow convection can not represented on those grids, but is a necessary pre-requisite for deep convection.
- Cloud cover and cloud-radiation interaction?
- Land-surface scheme? How important is it for initiation of convection? Tightly coupled to evolution of boundary layer structure!
- 3D radiation scheme necessary? Computationally challenging!
- Cloud microphysics plays a role, but less important than PBL scheme.

Possible ways forward:

- High resolution tests (convergence) going down to 500 m grid spacing, … but is 500 m sufficient? Probably not! Would need really big simulation/computer for a benchmark that is relevant to NWP.
- Would a 3D turbulence scheme be necessary/helpful for 1-3 km grid spacing?
- Tuning won't help, instead we have the work on physical relations used in turbulence schemes, e.g. representation of cloud cover. Nevertheless, modeling the 'grey zone' might be ill posed. Danger of counteracting errors which leads to a bad forecast model (Mironov). Should we do simulations/NWP at all at 2-4 km grid spacing? Depends on the forecast problem, e.g., hurricanes are a quite successful example.
- Assimilation/use of more surface/soil observations might be crucial.
- Stochastic parameterizations, e.g., stochastic backscatter like in LES or cellular automata to represent sub-grid structures? Interesting, but still in a very early stage of development/understanding.
- Are field experiments and additional observations helpful/needed for model developments? Difficult to observe the details of initiation of convection.
- Improve consistency between physical parameterizations!

Final statements:

- It is necessary to solve the problems on the 2-4 km scale, because we need those models in the future to run larger domains and convective-scale ensembles.
- Still considerable disagreement about many questions in convective-scale modeling!