

SRNWP workshop in Bad Orb, Mai 2011

working group on the initiation of convection

Chairperson: *Martin Köhler*

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Participants: *about 20 scientist from Europe, USA and Japan*

Definition: initiation of convection

- initiation, type/depth, precipitation, organization

Problems:

- High vertical velocities (10-15m/s) at high resolution (underresolved shallow convection)
- Fireworks (strong convergence and updrafts) in AROME/MesoNH
- Shallow convection phase missing.
- Convective organization missing at high resolution (measle problem, pop-corn convection)
- User perspective important (heavy precipitation events, stratus, winds)
- EPS size vs. clever postprocessing („neighborhood method“)
- Higher resolution benefit 1: help to better represent surface forcing like coast lines, sea breeze, lake effects, soil feedbacks, orography
- Higher resolution benefit 2: may describe convection better explicitly?
- Effective resolution good tool to investigate model quality.

Solutions / improvements:

- Shallow convection parameterization? (EDMF in AROME, none in UKMO HRTM)
(UKMO experiments with restricted mass-flux scheme, moist turbulence schemes)
- Cost benefit: Resolution, members and/or postprocessing
- High vertical resolution (lowest level at 5m) promising (e.g. fog prediction).
- Microphysics: better tuning of 1-moment schemes (need observations) before using 2-moment schemes
- Need for better surface datasets

Collaborations?

- Idealized benchmark case: compare operational SRNWP models to numerically converged benchmark solution, e.g. at 100 m resolutions. Semi-idealized case allows for easier interpretation than real case.
- Field experimental case intercomparison also desired: AMMA, COPS, CSIP, marine stratocumulus. Use statistical evaluation.
- Grey scale project. 1 – 10 km resolution tests proposed (deep convection grey zone)

Participating Models and their currently used resolutions

- AROME 2km, 1km, 500m, 250m
- MesoNH variable (research)
- COSMO 15km, 7km, 2.8km
- UKMO HRTM 4km, 2.2km, 1.5km, 500m
- JMA LFM 5km, 2km, 1km

Turbulence and convection closures currently used

- 2D, 3D turbulence
- TKE, EDMF/EDKF, Smagorinsky
- shallow-convection on/off