Convergence zones during COPS IOP 8b:
Results of COSMO simulations with 2.8 and 1 km grid resolution
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**Introduction**

- Deep convection developed in an area east of the Black Forest crest although CAPE was only moderate and CIN was high
- Data analysis (see oral presentation Adler et al.):
  - Convection was triggered by the superposition of a synoptically generated eastward moving mesoscale convergence zone and a thermally induced convergence zone along the mountain crests in the northern Black Forest
  - More in the south, radar observations at Feldberg also showed a convergence line hours before the cell northeast of Schramberg was initiated

**COSMO simulations:**

- Version 4.0, no parameterization of deep convection, 50 vertical layers in a generalized terrain-following coordinate, 6-class graupel scheme for microphysics, 2-time level Runge-Kutta method for dynamics
- Initial and hourly boundary data: COSMO-EU forecast, initial time 0 UTC

**Model results 2.8 km grid resolution:**

- Area A: Convergence line northeast of Freiburg from 12 to 15 UTC with subsequent formation of a line of shallow clouds in good agreement with observations (obs.: cloud line extends more to the N)
- Area B: Convergence zone in greater heights (1250 m) + secondary circulation systems: moisture transport from the Rhine valley towards Hornisgr. (in model runs)
- No deep convection, no precipitation

**Model results 1 km grid resolution**

- Area A: stronger convergence in thinner regions with more patterns
- Area B: convergence zones near Hornisgrinde less connected and shifted to the East
- Moisture transport from the Rhine valley/local evapotranspiration?
- No deep convection, no precipitation

**Discussion**

- Although parts of the convergence zone and subsequent cloud formation was reasonably well predicted, no deep convection was initiated in both model runs.
- Despite high values of CAPE (1000-2000 J/kg) accompanied by low values of CIN (5-40 J/kg), the improved representation of orographic effects was without result.
- Possible explanation: Strength of the convergence induced updraughts or humidity too small for CI
- Outlook: Comparison of measured wind field and wind profiles with both model runs, temperature stratification, lids?

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