The Flagship Pilot Study on Convection over Europe and the Mediterranean

A year three update

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Outline

• Motivation & Objectives
• Status
• Results
  • Process-based metrics
  • Test Cases/ensemble performance
• Challenges
• Next Steps
Motivation & Objectives

- Investigate convective-scale events, related processes and their changes in a few key regions of Europe and the Mediterranean using convection-permitting RCMs, statistical models and available observations.

- Provide a collective multi-model ensemble assessment and intercomparison our modeling capacity at convection-permitting scale.

- Shape a coherent and robust assessment of the consequences of climate change on convective phenomena impacts at local to regional scales.

Foto: Audun Braastad / NTB scanpix
Status of 10-year time slices

- **X-axis shows status**
  - 1 = finished/published
  - 2 = running
  - 3 = planned
- **Y-axis shows number of simulations**
Results: Test cases (Coppola et al. 2018)

Spatial pattern correlation high throughout; tight spread

Event well captured in both modes

Ensemble mean for both modes tracks obs well
Results: new methods for precipitation classification in CPM simulations

For each grid point, in a 30x30 km bounding box centered on that point:
Is the standard deviation of mid-tropospheric vertical velocity > 5 cm/s?

Yes

Is the standard deviation of orography-induced uplift vertical velocity > 20 cm/s?

Yes

Is the mid-tropospheric vorticity standard deviation > 2.5 $10^{-3}$ s$^{-1}$?

No

Stratiform

Convective

Orog-strati

Poujol et al., in-revision
Results: Evaluation Runs EUCP sub-set (Ban et al. 2019)

- Intensity of summer daily precipitation shows clear improvements at 3km vs. 12km
Results: Evaluation Runs EUCP sub-set (Ban et al. 2019)

- Heavy daily precipitation shows clear improvement
- But also large intermodel spread
- Emphasizes need for ensembles
Results: Evaluation Runs EUCP sub-set (Ban et al. 2019)

- Clear improvement in diurnal cycles
Challenges & Opportunities

- Wither statistical emulators?
  - Come to session D6 on Thursday 1400!
- Time: Only 2 more years! But now we move to analysis; Opportunity!

- Data handling: Where/how to analyze mountains of data?
- Funding: CORDEX and WCRP need to advocate for regional climate and regional downscaling

Weather generators can potentially be used to produce high temporal and spatial resolution data from after training on daily fields

Source: Mezghani & Hingray (2009)
DOI: 10.1016/j.jhydrol.2009.08.033
Next steps: 2020 and beyond

- Finish runs
- Research, research, research
- Publish, publish, publish
- Link up to other FPSs
- Plan for end of project
  - Publishing to ESGF
  - Linking to CORDEX future strategy
Thank you!

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