

Current LoCo activities

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First of all: a new job

- Assistant professor at Wageningen University
- Goal of position: understand role of small-scale processes in large-scale circulation
- This position allows me to be back in action in LoCo studies
- Next slides show current activities and my ideas about LoCo progress

Current activities I: simulation of convection and coupling

- Model development of MicroHH (www.microhh.org)
 - A new atmospheric Large-Eddy and Direct Numerical Simulation code
 - Unprecedented speed due to option of using graphics cards
 - Very suitable for doing sensitivity studies on soil moisture-convection link
 - Go beyond the onset of clouds: measure coupling in terms of cloud formation as well as precipitation as they might be very different!
 - Avoid the need of convection parameterizations: they might deliver wrong coupling
 - Tool is freely available, contact me if you are interested in using!
- Ahmed and I wrote proposal to combine his coupling metrics and MicroHH to make convection schemes land-aware
 - No funding :(
- Currently working on proposal (with Bart vd Hurk) to measure coupling in CMIP runs by doing sensitivity studies with MicroHH in coupling hotspots

Current activities II

- PhD student (Imme Benedict) working on precipitation and river discharge in Rhine and Mississippi catchment using climate model runs
 - Very different role of LoCo in both basins
 - LoCo very sensitive to climate model resolution
 - Strong influence of local convection in Mississippi basin
- PhD student (Irina Petrova) working on understanding soil moisture-precipitation feedback from high resolution satellite data in Sahel
 - Using high resolution links coupling measurements better to land-use types
- Study to the link between forest and cloudiness over European forests (with Ryan Teuling and others)
 - Satellite pictures show positive influence of forests on cloudiness in Europe
 - Frictional processes seem to play an important role
 - Coupling is difficult to understand from observations

My vision on how to progress in LoCo challenges

- Understand the chain evaporation - cloud formation - precipitation better with the help of simulation
 - Eliminate coupling uncertainty due to convection parameterizations
 - Understand the role of surface heterogeneity better
 - Do sensitivity studies in coupling hotspots using climate models as boundary conditions
- Focus more on the role of aerodynamic processes
 - Land surface influence on cloudiness and precipitation happens often through frictional processes (convergence and breezes), especially in Europe
- LoCo has been great thanks to the good organization!