

Invitation to virtual DK Guest Lecture

Towards km-resolution global climate models: prospects and challenges

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<https://unimeet.uni-graz.at/b/bru-xm2-gb7-yor>

Abstract

Currently major efforts are underway toward refining the horizontal resolution (or grid spacing) of climate models to about 1 km, using both global and regional climate models (GCMs and RCMs). There is the well-founded hope that this increase in resolution represents a quantum jump in climate modeling, as it enables replacing the parameterizations of moist convection and gravity-wave drag by explicit treatments. Recent results suggest that this approach has a high potential to improving the representations of the water cycle and extreme events, and to reducing uncertainties in climate change projections. Developing the approach on global scales for extended climate simulations requires a concerted effort. Key challenges include the exploitation of the next generation hardware architecture using accelerators (e.g. graphics processing units, GPUs), the development of new approaches to overcome the output avalanche of future climate models, and the maintenance of models on a number of different compute architectures. Despite these challenges, it will be argued that km-resolution GCMs, which are able to run at 1 SYPD (simulated year per day), might be closer than commonly believed.