Geophysical Research Abstracts
Vol. 20, EGU2018-10761, 2018
EGU General Assembly 2018

Extreme Earth: Advancing global storm resolving models to usher in a new era of climate modelling and climate change science.

Bjorn Stevens
Max Planck Institute for Meteorology, Managing Director, Hamburg, Germany (bjorn.stevens@mpimet.mpg.de)

Over the past decades climate models have contributed to many advances in our understanding of climate change. So it should come as no surprise that some of the most outstanding open problems in climate science, questions such as how clouds and circulation respond to warming, can be linked to basic and well recognized deficiencies in how these models are formulated. In the past, computational limitations and incomplete understanding forced us to accept these deficiencies. Today, the computational limitations are falling away, and a new quality of climate model— Global Storm (or Cloud) Resolving Models — is coming into more common use. By virtue of their ability to resolve the main modes of energy transport, these models (and their oceanic counterparts) provide a more fundamental representation of the climate system, and a more direct link to observations, than is possible with the quasi-two dimensional models that we have become accustomed to. By more naturally linking diabatic processes to circulation, these models offer the best chance to make progress on what otherwise seem to be intractable problems: from quantifying radiative forcing, to bounding climate sensitivity, to assessing factors influencing shifts in circulation patterns, to determining the origins of extremes. In this talk I will describe how and why differences between Global Storm Resolving Models and traditional climate models are so decisive. I will also outline how Extreme Earth, a European Initiative on Future and Emerging Technology, proposes to enable the use of Global Storm Resolving Models to usher in a new era of climate modelling and climate change science