KlimaCampus Hamburg

26.11.2015, 16:15

KlimaCampus Kolloquium

Prof. Rupert Klein

Multiscale asymptotics, balanced models and related numerics

Atmospheric flows cover spatio-temporal scales from raindrops to the Madden-Julian-Oscillation. Theoretical meteorology offers reduced descriptions of scale-dependent phenomena that capture the underlying dominant balances and mechanisms. Part I of the lecture will cover a systematization of such reduced models based on asymptotic analysis.
This approach lends itself naturally to studies of how scale-dependent phenomena couple across the scales. Part II discusses a non-standard example, namely the essence, regime of validity, and rigorous justification of "sound-proof" atmospheric flow models. Particular issues arise from the asymptotic three-scale nature of related flows.
Scale-dependent balances impose subtle constraints on numerical methods for the full compressible flow equations. Part III will demonstrate how theoretical insights from multiscale analysis can guide the construction and use of “well-balanced” numerics.

Prof. Klein from the Freie Universität Berlin is invited by the Center for Earth System Research and Sustainability

Bundesstraße 53, Room 22/23 (ground floor)