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Kolloquium für Mechanik

Referee: **Dr. Juan Pedro Mellado**
Max Planck Institute for Meteorology, Hamburg, Germany

Date: Thursday, Jan. 17, 2019, 15:45h
Location: Bldg. 10.81, HS 62 (R 153)

Title: **Small-Scale Turbulence in Planetary Boundary Layers: Recent Advances and Standing Challenges**

Abstract

Planetary boundary layers are multi-scale, multi-physics systems that are important not only for weather and climate but also for key sectors of our society such as transportation and wind and solar energy. Decades of theory, measurements and simulations have advanced the field tremendously, but key challenges remain. One challenge is to understand and quantify how turbulence interacts with density stratification, radiative transfer and cloud physics, and to represent those interactions in reduced models. The role of meter and submeter scales in those interactions has proven particularly difficult to unravel. Small scales near the surface and near the top of the planetary boundary layer can become crucial for the boundary layer as a whole by affecting the generation of turbulence kinetic energy. This is the case, for instance, in the stable boundary layer that can form at night or at high latitudes. Another example is entrainment, the process by which free-tropospheric air is incorporated and mixed into the boundary layer, which can strongly affect moisture and cloud properties. At the same time, it is very difficult to obtain accurate data at these small scales, both for measurements and for numerical simulations. During the last decade, however, direct numerical simulations have provided new insight into the role of meter and submeter scales and their coupling to the large scales in planetary boundary layers. I will use various examples to illustrate some of these recent advances and to indicate their potential development during the coming years.

Alle Interessenten sind herzlich eingeladen.
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