

SPRING 2019 SEMINAR SERIES

The Planetary Boundary Layer and Urban Air Quality

SPEAKER: Bernhard Rappenglück

Professor

Department of Earth and Atmospheric Sciences
University of Houston

WHEN: March 22, 2019 1:00 PM - 2:00 PM

WHERE: MREB ROOM 200

Multi-disciplinary Research and Engineering Building BLD#484

ABSTRACT

The planetary boundary layer (PBL) is the lowest layer of the troposphere. It is a crucial layer of the earth's atmosphere because it controls the transfer of heat, humidity, momentum, and trace gases between the surface and the atmosphere.

The PBL over land surface displays a well pronounced diurnal cycle. During daytime, surface heating generates positive sensible heat flux from the surface, resulting in an unstable and well-mixed convective boundary layer (CBL). Shortly before sunset radiative cooling of the surface layer results in the development of stable stratification of the PBL. As a consequence a thermally stable boundary layer (SBL) close to the earth's surface evolves. With time, this layer becomes decoupled from the upper portions of the PBL and a residual layer (RL) remains aloft. The mean and turbulent characteristics of the diurnal cycle of the PBL play an important role in determining the transport, storage and dispersion of atmospheric pollutants, especially close to the earth's surface and within the residual layer.

In this talk I will present most recent UH planetary boundary layer studies, which includes both experimental and modeling work, as part of urban air quality research in Houston, Santiago de Chile and in Mexico City.

WWW.UH.EDU/CTFM



BIO:

Dr. Bernhard Rappenglück is a Full Professor of Atmospheric Science in the Department of Earth and Atmospheric Sciences at NSM at UH. He obtained degrees in Meteorology (MS, 1991) and Physics (PhD, 1996) from the University of Munich/Germany and a Habilitation degree in Atmospheric Environmental Chemistry from the Munich University of Technology (2003). He joined UH in 2004. Prior to this, Dr. Rappenglueck worked as a Senior Research Scientist at the Institute of Meteorology and Climate Research, Atmospheric Environmental Research (IMK-IFU, 2001-2004), Garmisch-Partenkirchen, Germany, and as a Research Scientist at the Chair of Bioclimatology and Air Pollution Research, Munich University of Technology (TUM), Germany (1991-2001). Dr. Rappenglueck's research addresses meteorological and air chemistry processes on different spatial and temporal scales. It encompasses micrometeorological and boundary layer studies as well as regional and large-scale transport and chemical transformation processes within the troposphere. He has performed numerous studies on air quality both in urban (e.g. Munich, Berlin, Athens, Santiago de Chile, Mexico City, Houston, Los Angeles, Doha/Qatar) and remote areas (e.g. Upper Green River Basin, Wyoming; mountainous regions in central Greece or on islands in the Greek Aegean Sea region, e.g. Crete). He was also involved in airborne and ship-based missions. From 2002-2004 Dr. Rappenglueck was Head of the World Calibration Center for Volatile Organic Compounds (WCC-VOC) within the World Meteorological Organization-Global Atmospheric Watch (WMO-GAW) program hosted at the IMK-IFU, Garmisch-Partenkirchen, Germany. He led the first worldwide VOC intercomparison exercise within GAW and first VOC performance audits at GAW-sites. As a member of the WMO Science Advisory Group for Reactive Gases Dr. Rappenglueck has been involved in the development of long-term strategies for VOC measurements in GAW.