A sharper view of fuzzy objects: Clouds and their role in the climate system as seen by satellite

Ralf Bennartz
Atmospheric and Oceanic Sciences
University of Wisconsin – Madison

Clouds are arguably one of the most important factors modulating the earth's radiation budget. Yet our understanding of cloud processes, climate forcings, and potential feedbacks is still poor. Satellite data provide the only means to globally observe cloud properties and significant progress has been made in the field of satellite remote sensing over the last decade. The synergistic use of observations from active and passive instruments spanning the range from the visible to the microwave part of the electromagnetic spectrum provides an unprecedented opportunity to gain deeper insights into clouds and their climate interactions.

In this presentation the value of satellite observations in advancing our understanding of clouds in the climate system will be critically addressed. Examples both at a process level as well as the climate system level will be given based on research performed in my group over the last several years. It will be shown that important insights can be gained by studying limited-complexity conceptual models of clouds and their radiative characteristics. It is argued that only such a combination of observations, conceptual models, and elaborate climate models is essential to further unravel the role of clouds in the climate system.