UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences Seminar Announcement

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa
2525 Correa Road, HIG 350; Honolulu, HI 96822 ☎956-8775

SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

Study of atmospheric water over Bern by means of ground-based observations and numerical simulations

Federico Cossu, Ph.D.
Postdoctoral Researcher
Department of Atmospheric Sciences
University of Hawai'i at Mānoa

Date: Wednesday, February 22, 2017
Refreshments: 3:00pm at MSB courtyard
Free Cookies, Coffee & Tea Provided
(Please Bring Your Own Cup)
Seminar Time: 3:30pm
Location: Marine Sciences Building, MSB 100

Abstract:

Water vapour and cloud liquid water are two important atmospheric components. First, they play a fundamental role in the water cycle and, secondly, they greatly influence the Earth's radiation budget. Water vapour, in fact, is the most potent natural greenhouse gas, while clouds absorb infrared radiation emitted by the surface (warming effect) and at the same time they reflect part of the incoming solar radiation (cooling effect).
According to the latest IPCC assessment report, clouds and aerosols continue to contribute the largest uncertainty to estimates and interpretations of the Earth's changing energy budget. Water vapour and clouds (as well as precipitation) are represented in numerical weather prediction (NWP) models through parameterizations called microphysical schemes. In order to test the validity of such parameterizations, it is possible to compare the output of a NWP model with observations.
The Institute of Applied Physics (IAP) of the University of Bern has a long tradition of designing, developing, building and operating passive microwave radiometers that measure important atmospheric constituents including water vapour and ozone at different altitudes (troposphere to mesosphere). One of these radiometers, TROWARA, has been measuring integrated water vapour (IWV) and integrated cloud liquid water (ILW) at Bern since 1994. In this seminar I will present the research carried out during my PhD at the IAP.
By using TROWARA's observations and by comparing them with numerical simulations performed with the WRF model, I will show:
1) the differences between several WRF model's microphysical schemes in an idealized simulation;
2) a comparison of IWV and ILW observed by TROWARA and simulated by the WRF model in summer 2012 at Bern;
3) the characteristics of cloud fraction derived from ILW over a period of 10 years (2004-2013) above Bern.
I hope this seminar will convince you about the importance of the representation of cloud processes in numerical models and about the great potential of ground-based radiometry for model validation and cloud-related studies.