

# *The RAL Seminar Series*



## NCAR

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## **Relative Humidity in Liquid, Mixed Phase and Ice Clouds from In-situ Measurements**

by

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*Foothills Lab, Building 2, Auditorium, Room 1022, 3:30 p.m.*

The results of in-situ observations of the relative humidity (RH) in liquid, mixed and ice clouds at temperatures  $-45^{\circ}\text{C} < T_a < -5^{\circ}\text{C}$  are presented here. The data were collected with the help of instrumentation deployed on the National Research Council (NRC) Convair 580. The humidity of the water vapor was measured by the Licor water vapor analyzer. The Licor was calibrated in liquid clouds with the assumption that the water vapor is saturated with respect to water. This technique provided accuracy of RH measurements approximately 1%. It was found that the relative humidity in mixed phase clouds is close to saturation over water in the temperature range from  $-5^{\circ}\text{C}$  to  $-35^{\circ}\text{C}$  and the averaging scale 100 meters. In ice clouds the relative humidity is not necessarily equal to 100%, and it may be either lower or higher saturation over ice, but it is always lower than saturation over water. In average the relative humidity in ice clouds increases with a decrease of temperature. At  $-40^{\circ}\text{C}$  the relative humidity over ice is half between saturation over ice and liquid. The parameterization of the relative humidity in ice clouds is suggested here. A large fraction of ice clouds was found undersaturated with respect to ice. The parameterization of RH in mixed phase clouds in GCMs and climate models is discussed.