

Séminaire Vendredi 16 Novembre 11h00 / Seminar Friday November 16 11:00 AM

Conférencier/Lecturer: Alexei Korolev

Sujet/Subject: Mixed phase clouds: recent progress in theoretical analysis and in-situ observations

Présentation/Presentation: Anglais / English

Lieu/Room: Grande salle du premier étage CMC

Résumé/Abstract:

A new theoretical framework describing the thermodynamics and phase transformation of a three-phase component system consisting of ice particles, liquid droplets and water vapor is presented. The instant rates of changes of water, ice and vapor mixing ratios are described based on the quasi-steady approximation. It is shown that there are four different regimes of the partitioning of water between liquid, ice, and gaseous phases in mixed clouds. The Wegener-Bergeron-Findeisen (WBF) process is identified as one of those regimes. Previous theoretical studies suggested that glaciation of mixed phase clouds due to the WBF process should occur within 20-40 minutes. However, in-situ and remote sensing observations indicate that some clouds may stay in mixed phase conditions for hours and even days. The developed framework enabled explanation of long lasting stratiform cloud layers. New results from in-situ aircraft observations of relative humidity, frequency of occurrence, spatial inhomogeneity of mixed phase clouds collected from the NRC Convair-580 are discussed.