Aurélien Podglajen's PhD Defense

Aurélien Podglajen

Ondes et turbulence à la tropopause tropicale et impacts sur les cirrus
The 30-06-2017 at 14h00

Members of the jury:

M. Gwenaël Berthet, Examinateur
M. Jean-Pierre Chaboureau, Rapporteur
Mme. Martina Krämer, Rapporteur
M. Bernard Legras, Examinateur
M. François Lott, Examinateur
M. Emmanuel Rivière, Examinateur
M. Riwal Plougonven, Directeur de thèse
M. Albert Hertzog, Directeur de thèse

Summary:

Atmospheric waves and turbulence and their impacts on cirrus clouds in the Tropical Tropopause Layer (TTL, 14-18 km above sea level) are studied using in situ observations, numerical simulations and theoretical approaches.

First, long-duration stratospheric balloon measurements are used to analyze Lagrangian temperature and vertical wind fluctuations induced by gravity waves at the tropical tropopause. The amplitude and intermittency of wave fluctuations are assessed, and the observations are compared with resolved wave fluctuations in atmospheric models. Methods to parameterize Lagrangian temperature fluctuations are then discussed.

Then, some impacts of waves on cirrus cloud microphysics are examined. We first consider the influence of high frequency gravity waves on the ice nucleation process. Next, we explore the interplay between ice crystal sedimentation and advection by the wind perturbations induced by low frequency waves.

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