METEO FRANCE
Toujours un temps d'avance

SEMINAIRE - CNRM / GAME

N° 2011_18

vendredi 18 novembre 2011 à 11h

THE RISE AND FALL OF INTERNAL WAVES

par Bruce R. SUTHERLAND

Departments of Physics and of Earth & Atmospheric Sciences, University of Alberta, Canada

en salle de conférences de Navier

Résumé :

Internal gravity waves are known to be generated when a stratified fluid flows over topography, whether by winds over mountains in the atmosphere or by tides passing over submarine ridges in the ocean. Linear theory has been used to predict how they are generated, where they propagate and at which locations they break. However, the theory assumes the topography is smooth and wave amplitudes are small; and breaking is an inherently nonlinear process. The limitations of linear theory are examined using laboratory experiments, numerical simulations and theory. Boundary layer separation is shown to limit the amplitude of waves generated by steep topography. The evolution of moderately large amplitude waves is shown to change qualitatively through weakly nonlinear interactions between the waves and the mean flow that they induce (their ``Stokes drift''). In particular, hydrostratic atmospheric waves are shown to break tens of kilometers higher in the atmosphere than predicted by linear theory. Implications for the parameterization of internal waves in General Circulation Models are discussed.

Pour tout renseignement, contacter Y. Poirier (05 61 07 96 55) ou JL Sportouch (05 61 07 93 63)
Centre National de Recherches Météorologiques
42, Avenue G. Coriolis - 31057 Toulouse Cedex