LUCY CAMPBELL, Carleton University
Generation of internal gravity waves by convection

Internal gravity waves affect the general circulation of the atmosphere and hence it is important to understand their generation, propagation and interactions in order to represent them correctly in weather prediction and climate models. The primary mechanisms for gravity wave generation are convection in the lower atmosphere and topography. Convection is the movement of fluid particles from one location to another and it occurs in the atmosphere when the rate at which the temperature decreases with height exceeds a certain value. The mechanisms for the generation of internal gravity waves by convection are not fully understood. Investigations into these mechanisms generally involve large-scale simulations using general circulation models and gravity wave drag parameterizations. However, the high level of complexity of general circulation models and the large number of degrees of freedom involved make it complicated to identify and quantify relationships between the gravity waves and the convection. A mathematical study based on relatively simple equations that can be solved either analytically or numerically would allow us to investigate these relationships directly. In this study we develop a two-layer model of internal gravity waves over convective vortices and use weakly-nonlinear analyses and numerical simulations to obtain approximate solutions and investigate some of the current hypotheses for convective generation mechanisms.