The energy pathways of internal gravity waves in the ocean have received much attention since 20 years ago, when it was argued that the dissipation of these waves partly provide the potential energy required for the deep water masses to rise towards the surface. The now well-known sources of internal gravity waves are the tides passing over bathymetry, thereby generating the internal tide, and the winds blowing over the sea surface. However, it has recently been discovered that deep vigorous eddies flowing over rough bathymetry in the Southern Ocean could also produce lee waves.

The present talk will deal with the energy pathways of internal gravity waves close to the oceanic bottom in two different idealized configurations. We shall address the nonlinear reflection of the internal tide onto the oceanic bottom and show that almost all the incident wave energy is transferred locally to a strong mean flow and higher harmonics. The second situation deals with the lee wave field emitted by a barotropic current, mimicking the ACC in the Southern Ocean; we shall show that inertial oscillations are resonantly excited by the lee waves, which in turn promote their breaking in a layer of about 1000 m above the bottom.