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## Comparison of paradigmatic gravity wave models for ocean and atmosphere

**Uwe Harlander**

Brandenburg University of Technology (BTU) Cottbus, Aerodynamics and Fluid Mechanics, Cottbus, Germany (haruwe@b-tu.de)

It appears that oceanographers and meteorologists have different pictures in their minds when they speak about internal waves. The reason might be that in both communities different paradigmatic gravity wave models based on different simplifying assumptions are in use. For the oceanographer, internal wave beams are rather common, a feature virtually unknown to the atmospheric scientist. In contrast, wave packets traveling upwards in the atmosphere is the standard picture for the meteorologist. The mathematical origin of such a different view is that for time harmonic waves, the underlying boundary value problem for internal waves in the ocean is hyperbolic but elliptic for atmospheric flows.

In the present paper we discuss the consequences that result from these two different types of boundary value problems. Wave focusing is a rather generic process for hyperbolic problems and we argue that the latter should also be of interest to meteorologists in view of new findings that indeed a significant part of the internal waves in the atmosphere travel downward. We further apply some of our findings to new laboratory data on inertial modes arguing that an additional shear flow leads to an elliptic boundary value problem and beam-like wave fields, typical for the inertial waves without a shear flow, become mode-like.

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