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Leaky GFD problems[1] LYUBOV CHUMAKOVA, Univ of Edinburgh, ANDREW RZEZNIK, RODOLFO R. ROSALES, Dept. of Math, MIT — In many dispersive/conservative wave problems, waves carry energy outside of the domain of interest and never return. Inside the domain of interest, this wave leakage acts as an effective dissipation mechanism, causing solutions to decay. In classical geophysical fluid dynamics problems this scenario occurs in the troposphere, if one assumes a homogeneous stratosphere. In this talk we present several classic GFD problems, where we seek the solution in the troposphere alone. Assuming that upward propagating waves that reach the stratosphere never return, we demonstrate how classic baroclinic modes become leaky, with characteristic decay time-scales that can be calculated. We also show how damping due to wave leakage changes the classic baroclinic instability problem in the presence of shear. This presentation is a part of a joint project. The mathematical approach used here relies on extending the classical concept of group velocity to leaky waves with complex wavenumber and frequency, which will be presented at this meeting by A. Rzeznik in the talk "Group Velocity for Leaky Waves".

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