AMS Home   Journals Home   Journal Archive   Subscribe   For Authors   Help   Advanced Search | Search | Go |

Abstract View

Baroclinic Instability over a Slope. Part II: Finite-Amplitude Theory

J. E. Hart

Department of Meteorology, Massachusetts Institute of Technology, Cambridge 02139

ABSTRACT

Baroclinic instability of a circular current is modified by the presence of a unidirectional bottom slope. An analytical theory is developed for the slightly unstable flow regime over a weak slope. The presence of the slope creates azimuthal sidebands $n \mp$ to the basic azimuthal wavenumber n, of the instability. The interaction of the sidebands with the slope causes a decrease in the stability of the flow compared with that in the case with a flat bottom. The interaction of the sidebands with the primary baroclinic wave produces a *time-independent asymmetric* current. In addition, the basic wave self-interaction produces a time-independent current which flows up the slope and generates asymmetric vorticity. This latter effect is predominant when the Rossby radius of deformation is much smaller than the radius of the basic current.

Options:
- Create Reference
- Email this Article
- Add to MyArchive
- Search AMS Glossary

Search CrossRef for:
- Articles Citing This Article

Search Google Scholar for:
- J. E. Hart

top ▲