Abstract View

Volume 7, Issue 5 (September 1977)

Journal of Physical Oceanography
Article: pp. 691–701 | Abstract | PDF (667K)

The Time-Dependent Response of a Circular Basin of Variable Depth to a Wind Stress

G.E. Birchfield

Departments of Engineering Sciences and Geological Sciences, Northwestern University, Evanston, Ill. 60201

Brian P. Hickie

Atmospheric Sciences Laboratory, University of Illinois, Urbana 61801

(Manuscript received February 2, 1976, in final form April 28, 1977)

DOI: 10.1175/1520-0485(1977)007<0691:TTDROA>2.0.CO;2

ABSTRACT

By solving an initial value problem, the time-dependent response of a large circular model lake to a steady wind stress has been investigated. Bottom stress has been neglected. The forced response has been divided naturally into a "seiche" response and a quasi-geostrophic "current" response; the former is composed of gravity and topographic waves, the latter topographic waves only. The forced quasi-geostrophic response, consisting of coastal jets and return flow, slowly rotates cyclonically around the basin. The model is compared with forced barotrapic response observed in Lake Ontario.