

1. Record Nr.	UNINA9911019785203321
Autore	Stocker Thomas
Titolo	Topographic Waves in Channels and Lakes on the f-Plane // by Thomas Stocker, Kolumban Hutter
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 1987
ISBN	1-118-66918-5 3-642-50990-8
Edizione	[1st ed. 1987.]
Descrizione fisica	1 online resource (X, 176 p. 60 illus.)
Collana	Coastal and Estuarine Studies, , 0724-5890 ; ; 21
Disciplina	577
Soggetti	Ecology Oceanography Geophysics Geophysics/Geodesy
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	1. Introduction -- 1.1 Preamble -- 1.2 Waves in waters -- 1.3 Observations — Their interpretations -- 1.4 Aim of this work -- 2. Governing equations -- 2.1 Equations of adiabatic fluid flow -- 2.2 Vorticity, potential vorticity, topographic Rossby waves -- 2.3 Baroclinic coupling — the two-layer model -- 2.4 Continuous stratification -- 2.5 TW-equation in orthogonal coordinate systems -- 3. Some known solutions of the TW-equation in various domains -- 3.1 Circular basin with parabolic bottom -- 3.2 Circular basin with a power-law bottom profile -- 3.3 Elliptic basin with parabolic bottom -- 3.4 Elliptic basin with exponential bottom -- 3.5 Topographic waves in infinite domains -- 4. The Method of Weighted Residuals -- 4.1 Application to the TW-equation -- 4.2 Symmetrization -- 5. Topographic waves in infinite channels -- 5.1 Basic concept -- 5.2 Dispersion relation -- 5.3 Channel solutions -- 5.4 Velocity profiles -- 5.5 Alternative solution procedures -- 5.6 Hyperbolically curved channels -- 6. Topographic waves in rectangular basins -- 6.1 Crude lake model -- 6.2 Lake model with non-constant thalweg -- 7. Reflection of topographic waves -- 7.1 Reflection at a vertical wall -- 7.2 Reflection at an exponential shore -- 7.3 Reflection at a sin ² -shore -- 8. Review and outlook:

Review and outlook: Restrictions of this study — A list of unsolved problems -- 8.1 A brief summary -- 8.2 Validity of TW-equations -- 8.3 Single or multivalued dispersion relation -- 8.4 Bay-type modes -- 8.5 A list of unsolved problems -- 8.6 Measurements, observations -- Appendix A -- Appendix B -- Appendix C -- References -- Author Index.

Sommario/riassunto

The last one or two decades have witnessed an increased interest in topographic Rossby waves, both from a theoretical computational as well as an observational point of view. However, even though long periodic processes were observed in lakes and ocean basins with considerable detail, it appears that interpretation in terms of physical models is not sufficiently conclusive. The reasons for this lack in understanding may be sought both, in the insufficient spatial resolution or the brevity of the time series of the available data and the inadequacy of the theoretical understanding of long periodic oscillating processes in lakes and ocean bays. Advancement will emerge from intensified studies of both aspects, but it is equally our belief that the understanding of long periodic oscillations in lakes is presently likely to profit most from a theoretical-computational study of topographic Rossby waves in enclosed basins. With this tractate we aim to provide the reader with the basic concepts of wave motion in shallow waters at subinertial frequencies. Our questions throughout this monograph are essentially: How can the solutions to this topographic wave equation in a prescribed idealized domain be constructed; what are the physical properties of these solutions; are their features identifiable by observations; how reliable are such interpretations, etc.
