1. Record Nr. UNINA9910495176603321

Autore	Ozsoy Emin <1950->
Titolo	Geophysical fluid dynamics . II Stratified/rotating fluid dynamics of the atmosphere -- ocean. / / Emin Ozsoy
Pubbl/distr/stampa	2021 Cham, Switzerland : , : Springer, , [2021]
ISBN	3-030-74934-7
Edizione	[1st ed. 2021.]
Descrizione fisica	1 online resource (XVI, 323 p. 100 illus., 96 illus. in color.)
Collana	Springer Textbooks in Earth Sciences, Geography and Environment, , 2510-1315
Disciplina	551.51011
Soggetti	Geophysics - Fluid models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Stratified / rotating fluid dynamics of the atmosphere.– Ocean -- Development of the equations -- Basic and perturbed states -- Quasi-Geostrophic theory -- Internal waves -- Two-layer model -- Convection -- Boundary layers in stratified fluids -- Jets and buoyant plumes -- Diffusion and transport processes -- Equations for diffusion processes -- Simple models of turbulent diffusion and transport -- Shear flow dispersion -- Transport of suspended sediments -- Estuarine transport -- Simple ecosystem models -- Introduction -- Dynamics of ecosystems -- Ecosystem models.
Sommario/riassunto	This book develops a fundamental understanding of geophysical fluid dynamics based on a mathematical description of the flows of inhomogeneous fluids. It covers these topics: 1. development of the equations of motion for an inhomogeneous fluid 2. review of thermodynamics 3. thermodynamic and kinetic energy equations 4. equations of state for the atmosphere and the ocean, salt, and moisture effects 5. concepts of potential temperature and potential density 6. Boussinesq and quasi-geostrophic approximations 7. conservation equations for vorticity, mechanical and thermal energy instability theories, internal waves, mixing, convection, double-diffusion, stratified turbulence, fronts, intrusions, gravity currents Graduate students will be able to learn and apply the basic theory of geophysical fluid dynamics of inhomogeneous fluids on a rotating earth, including:

1. derivation of the governing equations for a stratified fluid starting from basic principles of physics 2. review of thermodynamics, equations of state, isothermal, adiabatic, isentropic changes 3. scaling of the equations, Boussinesq approximation, applied to the ocean and the atmosphere 4. examples of stratified flows at geophysical scales, steady and unsteady motions, inertia-gravity internal waves, quasi-geostrophic theory 5. vorticity and energy conservation in stratified fluids 6.boundary layer convection in stratified containers and basins.