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Titolo	Chemical and biological processes in fluid flows [[electronic resource]] : a dynamical systems approach / / Zoltan Neufeld, Emilio Hernandez-Garcia
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ISBN	1-282-75976-0 9786612759765 1-84816-178-6
Descrizione fisica	1 online resource (304 p.)
Altri autori (Persone)	Hernandez-GarciaEmilio <1963->
Disciplina	532.5015118
Soggetti	Fluid dynamics - Mathematical models Fluid mechanics - Mathematical models Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents; Preface; Chemically and biologically reacting flows; Plan of the book; 1 Fluid Flows; 1.1 Conservation laws; 1.2 Laminar and turbulent flows; 1.3 Turbulence; 1.4 Kolmogorov's theory of turbulence; 1.5 Two-dimensional flows; 2 Mixing and Dispersion in Fluid Flows; 2.1 Introduction; 2.1.1 Advection; 2.1.2 Diffusion; 2.1.3 Advection and diffusion; 2.2 Steady two-dimensional flows; 2.2.1 Advection along streamlines; 2.2.2 Dispersion of diffusive tracers in steady flows; 2.3 Advection in weakly time-dependent two-dimensional flows; 2.4 Chaotic advection in three dimensions 2.5 Dispersion by chaotic advection 2.5.1 The Lyapunov exponent; 2.6 Chaotic advection in open flows; 2.7 Chaotic advection and diffusion; 2.7.1 The filament model; 2.7.2 Asymptotic decay in chaotic flows; 2.8 Mixing in turbulent flows; 2.8.1 Relative dispersion in turbulence; 2.8.2 Passive scalar in turbulent flows; 2.9 Distribution of inertial particles in flows; 3 Chemical and Ecological Models; 3.1 Chemical dynamics; 3.1.1 The Law of Mass Action; 3.1.2 Binary, First-Order, and Zeroth-Order Reactions; 3.1.3 Autocatalytic and Enzymatic Reactions: The adiabatic elimination

3.1.4 Oscillations and excitability 3.1.5 Multistability; 3.2 Biological models; 3.2.1 Simple birth, death and saturation; 3.2.2 Predator-Prey models; 3.2.3 Competition; 3.3 Summary; 4 Reaction-diffusion Dynamics; 4.1 Diffusion and linear growth; 4.1.1 Linear spreading of perturbations; 4.1.2 The minimum habitat-size problem; 4.1.3 Plankton filaments; 4.2 Fisher waves; 4.3 Multistability: Fronts advancing on metastable states; 4.4 Excitable waves; 4.5 Turing diffusive instabilities; 4.6 Oscillatory media and beyond; 5 Fast Binary Reactions and the Lamellar Approach
5.1 Lamellar reacting models 5.2 Fast binary reactions in simple flows; 5.3 The fast binary reaction in complex flows; 6 Decay-type and Stable Reaction Dynamics in Flows; 6.1 Stable reaction dynamics and its global steady state; 6.2 The spectrum of decaying scalar in a flow; 6.2.1 The inertial-convective range; 6.2.2 The viscous-convective range; 6.3 Smooth and filamental distributions .; 6.4 Structure functions, multifractality and intermittency; 6.5 Two-dimensional turbulence with linear damping; 7 Mixing in Autocatalytic-type Processes; 7.1 Mixing in autocatalytic reactions
7.1.1 The closed-flow case7.1.2 The open flow case; 7.1.3 Results from the filament model; 7.1.4 Front propagation in cellular flows; 7.2 Mixing and bistable dynamics; 7.3 Mixing in excitable dynamics; 7.3.1 Excitable plankton dynamics; 7.4 Competition dynamics; 8 Mixing in Oscillatory Media; 8.1 Synchronization of oscillatory dynamics by mixing; 8.1.1 Persistent patterns in uniform medium; 8.2 Synchronization in non-uniform medium; 8.3 Noise induced oscillations in excitable media; 8.4 The effect of chaotic dispersion on cyclic competition; 9 Further Reading
9.1 Complex fluids and reactive flows

Sommario/riassunto

Many chemical and biological processes take place in fluid environments in constant motion - chemical reactions in the atmosphere, biological population dynamics in the ocean, chemical reactors, combustion, and microfluidic devices. Applications of concepts from the field of nonlinear dynamical systems have led to significant progress over the last decade in the theoretical understanding of complex phenomena observed in such systems. This book introduces the theoretical approaches for describing mixing and transport in fluid flows. It reviews the basic concepts of dynamical phenomena arising

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ISBN	1-282-37163-0 9786612371639 1-4443-1334-7 1-4443-1333-9 0-632-06332-7
Descrizione fisica	1 online resource (325 p.)
Altri autori (Persone)	FreyMartin <1940-> RobinsonDoug <1947->
Disciplina	552 552/.4
Soggetti	Metamorphism (Geology) Geology Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
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Nota di contenuto	Low-Grade Metamorphism; Contents; List of contributors; Preface; 1: Low-temperature metamorphism: an overview; 1.1 What is it?; 1.2 A decade of progress; 1.3 Very low-grade metamorphism in a global setting; 1.4 Does low-tempereture metamorphism matter?; 1.5 Mineral abbreviations; 2: Very low-grade metapelites: mineralogy, microfabrics and measuring reaction progress; 2.1 Metapelitic rock.; 2.1.1 Introduction; 2.1.2 Metapelitic zones and lithology; 2.1.3 Metastable equilibrium and clay mineral reaction progress; 2.2 Mineralogical relations; 2.2.1 Phyllosilicate reaction series 2.2.2 Smectite-I/S-illite-muscovite2.2.3 Smectite-corrensite-chlorite; 2.2.4 Kaolinite-pyrophyllite; 2.2.5 Berthierine; 2.3 Metapelitic microfabrics; 2.3.1 Introduction; 2.3.2 Mlcrofabrics of the late diagenetic zone; 2.3.3 The anchizone and slaty cleavage development; 2.3.4 The anchizone-epizone transition; 2.4 Measuring reaction progress; 2.4.1 X-ray diffraction techniques; 2.4.2 Transmission

Sommario/riassunto

Low-Grade Metamorphism explores processes and transformations in rocks during the early stages of metamorphic recrystallization. There has been little analysis and documentation of this widespread phenomenon, especially of the substantial and exciting advances that have taken place in the subject over the last decade. This book rectifies that shortfall, building on the foundations of Low-Temperature Metamorphism by Martin Frey (1987). The editors have invited contributions from an internationally acknowledged team of experts, who have aimed the book at advanced undergraduate and