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N. J. Balmforth A. Provenzale (Eds.)

Geomorphological Fluid Mechanics



Springer

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Preface

This volume contains the lecture notes from the Gran Combin Summer School, held in Saint Oyen, Aosta, Italy, in the second half of June 2000. The lectures, loosely connected through the broad heading of “Geomorphological Fluid Mechanics,” explored a variety of topics involving the fluid flows encountered in geomorphology and in related geological problems. Specific topics included lava and mud flows, ice dynamics, snow avalanches, river and coastal morphodynamics, and landscape formation. The aim of the school was to unite these topics using their common mathematical and physical language. The lecture notes have four parts, each with a particular theme: Fundamentals, Hot, Cold and Dirty. In these parts, we include chapters of a more basic nature (Fundamentals), chapters relevant to magma and lava (Hot), to ice flow (Cold), and to fluids in which the transport of suspended particles is critical (Dirty). Each division has its own opening chapter that gives a brief introduction to each theme.

The directors of the course “Geomorphological Fluid Mechanics,” were Neil J. Balmforth (University of California, Santa Cruz, USA) and Antonello Provenzale (Istituto di Cosmogeofisica, CNR, Torino, Italy), who also acted as scientific editors for these lecture notes. Jost von Hardenberg (Istituto di Cosmogeofisica, CNR, Torino, Italy) was the scientific secretary and Laura Roma was the administrative assistant of the school. Costanza Piccolo was our industrious technical editor who collected together all the notes and painstakingly edited them; without her assistance, the chapters may never have seen the light of day.

The main lecturers of the school were Ross Griffiths (Australian National University), Kolumban Hutter (University of Darmstadt), Chiang C. Mei (Massachusetts Institute of Technology), Gary Parker (University of Minnesota), Giovanni Seminara (University of Genova), Terence R. Smith (University of California at Santa Barbara), Jack Whitehead (Woods Hole Oceanographic Institution) and Andy Woods (University of Cambridge). Special lectures were also given by Christophe Ancey (CNRS, Grenoble), Augusto Biancotti (University of Torino), Richard Craster (Imperial College, London), Andrew Fowler (University of Oxford), Stuart B. Savage (McGill University, Montreal), and John Wettlaufer (University of Washington).

The Gran Combin Summer School is a joint enterprise of the French CNRS and Italian CNR, whose general theme is “Fundamental Problems in Geophysical and Astrophysical Fluid Dynamics.” Local organization and funding each year is provided by the “Istituto di Cosmogeofisica” (CNR, Torino, Italy), by the Groupement de Recherche “Mécanique Fondamentale des Fluides Géophysiques et Astrophysiques” (CNRS, France) and by the Laboratoire de Meteorologie Dynamique, ENS-CNRS, Paris. Support for the summer school also comes from the APT Gran St. Bernard, Valle d’Aosta (Italy), the Regional Government of Valle d’Aosta, and the Comunità Montana “Grand Combin.”

Woods Hole,
August 2001

Neil J. Balmforth
Antonello Provenzale

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