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Mountain Weather and Climate
Third Edition

Mountains and high plateau areas account for a quarter of the Earth's land surface. They give rise to a wide range of meteorological phenomena and distinctive climatic characteristics of consequence for ecology, forestry, glaciology and hydrology. *Mountain Weather and Climate* remains the only comprehensive text describing and explaining mountain weather and climate processes. It presents the results of a broad range of studies drawn from across the world.

Following an introductory survey of the historical aspects of mountain meteorology, three chapters deal with the latitudinal, altitudinal and topographic controls of meteorological elements in mountains, circulation systems related to orography, and the climatic characteristics of mountains. The author supplies regional case studies of selected mountain climates from New Guinea to the Yukon, a chapter on bioclimatology that examines human bioclimatology, weather hazards and air pollution, and a concluding chapter on the evidence for and the significance of changes in mountain climates.

Since the first edition of this book appeared over two decades ago several important field programs have been conducted in mountain areas. Notable among these have been the European Alpine Experiment and related investigations of local winds, studies of air drainage in complex terrain in the western United States and field laboratory experiments on air flow over low hills. Results from these investigations and other research are incorporated in this new edition and all relevant new literature is referenced.

ROGER G. BARRY is Distinguished Professor of Geography at the University of Colorado and Director, World Data Center for Glaciology and the National Snow and Ice Data Center, Boulder.

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MOUNTAIN WEATHER AND CLIMATE

THIRD EDITION

ROGER G. BARRY

University of Colorado, Boulder, USA

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PREFACE TO THE THIRD EDITION

Research into mountain weather and climate has gained momentum over the 15 years that have elapsed since the publication of the second edition. Studies of the meteorology and climatology of mountains regions of Central Asia and South America, in particular, have provided material for new sections in Chapter 5, with shorter sections on the equatorial mountains of East Africa and the Southern Alps of New Zealand. The high ice plateaus of Greenland and Antarctica are also included. There has also been more attention paid to changes in mountain environments, as part of the widening concern over global warming and through the International Panel on Climate Change (IPCC) for its second (1995), third (2001), and fourth (2007) assessment reports. Accordingly, the scope of the material in Chapter 7 has expanded. Research in mountain meteorology has benefited from projects such as the Mesoscale Alpine Program (MAP) and other more local individual endeavors in different parts of the world. Improvements in instrumentation, data recording and transmitting, and new satellite, airborne and ground-based remote sensing, are all changing the ways in which data can be collected. Data analysis, combined with higher resolution numerical modeling, is also becoming increasingly common.

The basic structure of the book remains unchanged, and apart from updating throughout, and corrections where appropriate, most of the original text has been retained. I believe firmly in recognizing important early contributions to the subject, as well as the latest advances. Some recent references incorporated in the bibliographies are not discussed in the text.

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