CLIMATIC CHANGE AND ITS IMPACTS

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CLIMATIC CHANGE AND ITS IMPACTS

An Overview Focusing on Switzerland

by

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Foreword

Climatic change is a rapidly evolving domain that has prompted the publication of numerous scientific works in recent years. These publications reflect both the public and scientific interest in the topic, as well as the progress in science that observation and modeling has allowed since concerns were raised about the human influence on climate in the last quarter of the 20th century.

This book provides an overview of climate processes, variability and change and applies the general principles related to these issues to the particular case of Switzerland. Although a small country, Switzerland is located in a region of complex topography where climate processes can often be of a very dynamic nature due to the presence of the Alps. Indeed, monitoring of climate in mountains may enable the early detection of the anthropogenic climate signal more readily than other regions, particularly those where urbanization or low-level boundary-layer processes can contaminate data and thereby lead to difficulties in disaggregating different signals in the record. In addition, there is a remarkable density of observational data in Switzerland, ranging from climate, ecology, and land-use, to socio-economic statistics. Access to high quality data enables a comprehensive assessment of climate processes and their long-term trends, comparisons of modeling techniques with real-world data, and environmental and socio-economic investigations of the impacts of climatic change on the natural, social, and economic environments.

This book principally draws upon recent scientific work by the author, based on research conducted within scientific networks both in Switzerland and Europe. It contains in a single volume an overview of the fundamentals of climate, methods of observation and modeling of the climate system, and applications of these basic concepts and paradigms to the particular case of Switzerland. The focus on the alpine region serves to highlight regional climatic change at low, medium, and high-elevation sites as observed over the past 100 years, and the latest climate model data enables a look into coming decades as climate responds to increasing concentrations of greenhouse gases in the atmosphere. Consideration is given to shifts in mean climate and extremes in the 20th century and the latter part of the 21st

century, and to the impacts of expected change on the alpine cryosphere, hydrology, and vegetation as well as on certain managed systems such as agriculture, energy supply and tourism.

The book is aimed primarily at an academic audience from the graduate level and beyond, but may attract the interest of the general public as it strives to strike a balance between descriptive and technical aspects related to the diverse topics that are addressed. The monograph is a contribution to international efforts aimed at furthering the understanding of the intricacies of climate at local and regional scales, and the consequences of regional climatic change on the alpine domain.