Review


This volume is derived from a symposium held during the XXII General Assembly of the International Union of Geodesy and Geophysics in Birmingham in July 1999 and addresses interactions between the cryosphere and climate forcing. It includes 30 papers divided into four groups as follows:

Interactions between climate, snow and permafrost (9)
Monitoring and modeling snow cover (5)
Ice mass variability (10)
Chemical processes in the cryosphere (6)

The authorship of the papers reflects the international nature of the symposium with ten from China, five from Canada, four from USA and UK, two from Russia and Switzerland and one from France and Japan while one paper is jointly authored by Russian and USA scientists. The southern hemisphere is clearly not well represented though at least two New Zealand scientists working overseas are included. The editors are from UK, USA, France and Canada.

Apart from one paper on permafrost the first section is mainly about seasonal snow and the papers in it deal mainly with large areas ranging from the whole northern hemisphere to large mountain ranges. These papers examine both the response of seasonal snow amounts and permafrost to climate change on the scale of several decades and the inter-annual variations of snow accumulation and snow melt as a function of shorter term climate variations.

The papers on monitoring and modeling range in scale from single snow crystals through blowing snow processes, energy transfers and melt over patchy snow cover to runoff effects in catchments of over 10,000 km².

All but two papers in the ice variability section deal with northern hemisphere glacier variation at timescales from a few years up to 2000 years (the latter using oxygen isotopes derived from ice cores on the Tibetan Plateau). The exceptions include a reconstruction of climate in western China during the last glacial maximum and the only southern hemisphere study in the volume which presents information on the Collins Ice Cap on King George Island in the South Shetlands over the 21 years up to and including 1992.

The final section contains three papers on chemical weathering in glaciated areas, two dealing with isotope studies of precipitation and ice cores and an experimental study of the resistance to diffusion of soil gases through a seasonal snow cover.

Although all of the thirty papers relate in some way to the cryosphere, they cover a vast range of topics. Thus they represent a good snapshot of what scientists interested in explaining the role of the cryosphere in climate are presently working on, even though
some very important topics such as Antarctic ice and southern hemisphere sea ice variability are not covered. In some papers it is clear that in areas where the cryosphere has significant resource value, there are large databases. For example, a study of the interannual variability of snow cover in the former Soviet Union uses data from over 200 stations over a period of 25 years and an investigation of climate change effects on snow accumulation in the Sierra Nevada analyses data from 260 snow courses for periods of up to 50 years.

The volume is generally well produced though some of the diagrams are over-reduced and consequently difficult to decipher. While the volume would be of interest mainly to scientists working on snow and ice, it would be a useful addition to university libraries and climate related research institutes.

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