

Hydrological aspects of alpine and high-mountain areas

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HYDROLOGICAL ASPECTS OF ALPINE AND HIGH- MOUNTAIN AREAS

Edited by J. W. Glen

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Preface

This symposium has been organized by the International Commission on Snow and Ice (ICSI) as their contribution to the First Scientific Assembly of IAHS. The decision to hold this Assembly was taken during the IUGG General Assembly in Canberra in December 1979, and was seen as an opportunity for the Association to hold meetings that would bring together hydrologists over the whole range of the Commissions. This did, however, pose problems for ICSI, which had already planned a number of symposia, several jointly with other bodies. It was felt that the aims of the Exeter Assembly could best be furthered by organizing a symposium that drew together interests of ICSI with those of hydrologists whose primary affiliation might be with other Commissions, and, bearing in mind the great importance of water from snow and glaciers for the irrigation of many areas of the world, and of the difficulties and dangers caused by some glaciologically caused disasters, the theme of *Hydrological aspects of alpine and high-mountain areas* was proposed by the Bureau of ICSI at its meeting in Helsinki in June 1980.

The alpine and high-mountain areas of the world play an extremely important and distinctive role in the hydrological processes of the planet, and in the regional hydrology of all continents. It is in alpine regions where meteorological, glaciological, periglacial and hydrological phenomena have most intimate and complex interaction and variability on short space scales and short time scales, yet the results of these interactions have a profound effect on hydrological regions over much greater distances and longer time periods. However because of this variability of interaction, and because of the characteristic irregularities of topography, surface and subsurface texture, and contrasts of albedo, high mountain areas present extremely difficult problems of hydrometeorological or energy exchange observation and sampling, and are poorly suited to the modelling or mathematical treatment of data. This symposium has been planned to provide an opportunity for examination of the problems and recent progress in the study and interpretation of hydrological processes in alpine and high mountain areas, and to promote an exchange between those concerned with precipitation in mountain areas, the formation and movement of alpine snow and ice masses, runoff and water storage and groundwater phenomena in mountains, and the hydrological aspects of erosion in mountainous terrain.

The papers submitted to the symposium cover a wide range of topics within this theme. They have been divided into seven groups which will each be considered at one half-day session of the symposium. The first concerns regional and general aspects of alpine hydrology, and contains several papers on the Central Asian region. The second is devoted to water storage in snow, how to measure it, and the changes which occur within the snow-pack. The third concerns the characteristics of water storage and drainage in glaciers, and the fourth the characteristics of water storage and release by snow.

The fifth and sixth are both devoted to runoff processes in alpine areas, being respectively focused on modelling and on mountain basins. The final group deals with erosion, sediment transport and deposition in mountain areas.

For each group all the papers that were received and which passed the refereeing procedure have been retyped in standard form and are presented in this volume, in alphabetical order of authors within each group. A paper on the WMO project for the intercomparison of conceptual models of snowmelt runoff, which has no named author, appears at the beginning of group 5.

Together these papers represent a wide-ranging view of the hydrology of alpine and high-mountain areas and are presented to the symposium as it meets in the confident expectation of fruitful discussions and a most interesting meeting that should help us to solve some of the major hydrological problems in these important areas.

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