THE ROLE OF SNOW DEPOSITS IN RAINFALL-RUNOFF SIMULATIONS FOR SMALL HIMALAYAN BASINS, NEPAL

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The sparse availability of data for the evaluation of water storage in snow covers and glaciers makes conceptual models reasonable tools for an inverse task, i.e. the improved estimation of inputs in the rainfall-runoff process in those cases where precipitation and discharge are known. This problem is obvious and urgent in mountainous areas.

The daily time series of precipitation and discharge and air temperature ov.. six years, from 1988 to 1993 have been used for runoff simulation in the following Himalayan basins: Imja *Khola* of Khumbu region (4,375-8,501masl, 135km², 27% glaciated), Langtang *Khola* (3,800-7,232m, 340km², 38%) and Modi *Khola* of Annapurna area (3,160-8,091m, 148 km², 33%). The modelling tools used were the *Sacramento Soil Moisture Accounting Model* in connection with Anderson's Snow Model.

Due to some uncertainties concerning the representativness of individual data series, some analyses and comparisons of alternative outputs have been carried out which provide an idea about some aspects of topography (vertical gradients of air temperature and precipitation, their seasonality, etc).

For the estimation of runoff changes caused by land-use changes, simulation in which inputs and parameters have been altered may be used; sensitivity analysis using incremental scenarios also provides some idea of the possible effects of climatic warming.

Fig. 1 Observed and simulated discharge, Langtang Khola

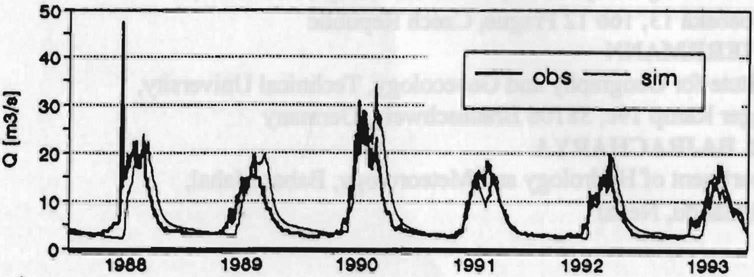

Fig. 2 Influence of air temperature gradient on simulated discharge, Langtang Khola

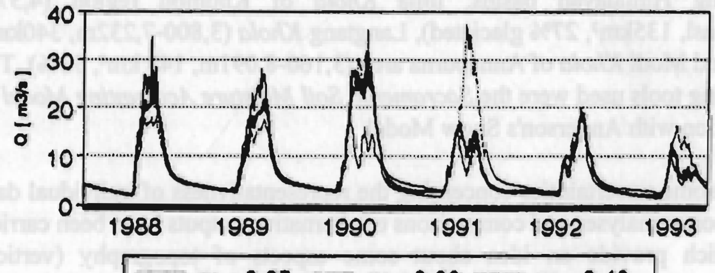

Fig. 3 Effects of air temperature change on simulated discharge, Langtang Khola