Hydrological Characteristics of the Dokriani Glacier in the Garhwal Himalayas

Singh Pratap, K S Ramasastri, U K Singh, J T Georgian and D P Dobhal

Hydrological Science Journal, vol. 40, No. 2, pp. 243-257, 1995

Observations of discharge, temperature and suspended sediment made at a gauging site established near the snout of the Dokriani glacier in the western Himalayan region are presented. These observations were made during a scientific expedition to this glacier over 21 days (23.8.1992-12.9.1992). Because of harsh weather conditions, observations could not be made for a longer period. The minimum streamflow in the glacier melt stream was observed at 0700h whereas the maximum was observed at 1800 h. The ratio of maximum to minimum flow was computed to be 1.81 from the continuous hourly observations. Based on an analysis of the recession of the hydrograph, it was found that the meltwater time lag from the accumulation zone of the glacier was more than seven times higher than that from the ablation zone. No specific relationship was observed between suspended sediment and discharge. The average values of the suspended sediment concentration and load were found to be 350 ppm and 180 t day-1 , respectively, for the study period. Weathering processes in different zones of the glacier were also studied to find out the source of the sediment transported by the melt-water into the melt stream. A high correlation coefficient (r = 0.89) was found between the glacier specific runoff and the air temperature at the gauging site. It showed that temperature alone can represent the melting of the glacier and may be considered for the hydrological modelling of glacier melt runoff.

Topographical Influence on Precipitation Distribution in Different Ranges of Western Himalayas

Singh Pratap, K S Ramasastri and Naresh Kumar

Nordic Hydrology, Vol. 26, No. 4/5, pp. 259-284, 1995

Seasonal and annual distribution of rainfall and snowfall with elevation has been studied for outer, middle and greater Himalayan ranges of Chenab basin in the western Himalayas. Rainfall and snowfall exhibited different trends with elevation on the windward and leeward slopes of the three ranges of Himalayas. Seasonal characteristics of rainfall have shown a spill over effect on leeward side during winter, pre-monsoon, and post-monsoon seasons in the outer Himalayas. The role of orography in the middle Himalayas was found to be more pronounced for both rainfall and snowfall in comparison to other ranges of Himalayas. Variation of snowfall with elevation was more prominent in comparison to variation of rainfall. In the greater

Himalayan range it is found that rainfall decreases exponentially with elevation and snowfall increases linearly. Rainfall becomes negligible at elevations beyond 4,000 m on the windward side of the greater Himalayan range. Efforts have also been made to explain whether variation in precipitation is due to changes in precipitation intensity or number of precipitation days or a combination of both.

Climate Change and Hydrology with Emphasis on the India Subcontinent
Divya and R Mehrotra

Hydrological Sciences Journal, April 1995, Vol.40, pp:231-242

On a regional scale, some of the most profound impacts of climate change due to increases in greenhouse gas would probably be major changes in the hydrological cycle, in water availability, in agricultural production and in the use of energy. This paper gives a brief overview of studies carried out on climate change and possible impacts on hydrology and water resources in India, covering also the agricultural aspect. The need is emphasised for carrying out further studies in this important subject area at the national level, keeping in view the data and computing facilities available.

Some Issues of Water Quality Monitoring
Ghosh N C, Jain C K and A Tyagi

Asian Environment : 78-91, 1995

Macrolocation and microlocation, besides the economic externalities, are the two important criteria to identify location of monitoring and sampling station for a river reach. Available techniques for selecting of monitoring stations would give an idea of probable sites for monitoring and sampling. However, spot survey would be the main criterion to judge the final location. Sharp's procedure which is widely used for selecting location of monitoring station, would be more effective to fix the monitoring networks for a large basin having number of tributaries which are like a stream rather than a basin led by a small river. A case example discussed herein highlights issues involved in the water quality monitoring.

A Conceptual Model of Catchment Water Balance : I Formulation and Calibration
Ponce, V M and A V Shetty

Journal of Hydrology, Vol. 173 : 27-40, 1995

A conceptual model of a catchments annual water balance is developed. The model is based on the sequential separation of annual precipitation into surface runoff and wetting, and wetting into baseflow and vaporization. The separation is based on a proportional relation linking the three variables involved at each step. Given a set of model parameters, the method can be used to separate annual precipitation into its three major components; surface runoff, base flow and vaporization. Initial application of the method to literature catchment, data provided encouraging results. The method can be used for estimates of annual water yield throughout the climatic spectrum. The model parameters can be estimated from past experience or calibrated using measured data.

A Conceptual Model of Catchment Water Balance : II Application to Runoff and Baseflow Modelling

Ponce, V M and A V Shetty

Journal of Hydrology, Vol. 173 : 41-50, 1995

A conceptual model of catchment water balance developed in the companion paper (Ponce & Shetty, J.Hydrol,173; 27-40, 1995) is used to simulate changes in runoff and baseflow with annual precipitation. The model is based on the sequential separation of annual precipitation into surface runoff and wetting, and wetting into baseflow and vaporisation. Runoff is the sum of surface runoff and baseflow. Runoff gain is defined as the derivative of runoff coefficient with respect to precipitation. Baseflow gain is defined as a derivative of baseflow coefficient with respect to precipitation. Catchment data show that runoff and baseflow gains are always positive. Runoff gain reaches a peak value at a threshold precipitation. Pn; Baseflow gain reaches a peak value at a threshold precipitation Pnt. Analysis of the runoff and baseflow functions sheds additional light on the nature of the competition between runoff and vaporisation, and baseflow and vaporisation.