Physical Research Laboratory

Tuesday Seminar

Karst Geomorphology, Cave Development, and Hydrological Characterisation of Karst Aquifers in the Kashmir Valley, Western Himalaya, India.

Abstract

Karst aquifers contribute substantially to freshwater and thermal water supplies in many region of the world. Kashmir Valley, one of the largest karst region on the Indian Subcontinent and the Himalaya, provides significant karst geomorphic imprint due to wide distribution of carbonate rocks. Karstified carbonate rocks has a high hydraulic conductivity ~1000m d^{-1}, thereby, represents a major hydrogeological unit and a regionally important groundwater reservoir. Dissolution of carbonate rocks, (development of exokarstic and endokarstic features), abundant water resources in the form of large cold and warm springs, and subsequent development of floating gardens designed at spring outlets, has led to label the karst areas in the region as State Geoparks, which features the region a popular holiday destination, a backbone to regional economy. Past phreatic morphology and present relict nature suggest that the landscape evolution has changed the hydrologic conditions from phreatic to vadose, and thereby, modified the processes of speleogenesis and the characteristics of the caves. The uplift and erosion in Pilo-Plestocene is dynamic cause which governed the processes of karst development, likewise, climatic oscillations in the same period changed the solutional rates, and dominance of either chemical or mechanical. Although the spring flow is dominantly controlled by the melting of snow and/or glaciers, rain events produce sharp spikes in spring hydrographs, primarily responsible for the undulating/seasonal trend in the $\delta^{2}H$ and $\delta^{18}O$ of the karst springs. Furthermore, the study provides new insights in understanding the dominant factors affecting the isotopic composition of the precipitation, snowpack, glacier melt, streams and springs. $\delta^{18}O$/ or $\delta^{2}H$ of precipitation, snowpacks, glacier melt and karst springs show wide variation both in space and time, and are strongly influenced by the basin relief and meteorology. Similar temporal trends of isotopic signals in streams and karst springs reflect the rapid flow transfer due to karstification of the carbonate aquifers. Tracer breakthrough curves (TBC), retrieved for different springs suggest short travel time (2 to 7 d) and rapid conduit flow, which has practical consequences like, deterioration of water quality and variation in magnitude of groundwater flux in the region.

Speaker: Dr. Rouf Ahmad Shah
PDF, GSDN

Date	Time	Venue
05- June-2018	16:00 hrs	Ground Floor Lecture Hall

All are invited to attend and participate in discussion

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