

Stables isotope (hydrogen and oxygen) characteristics of groundwater in Kathmandu valley, Nepal

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Stable isotopic composition (hydrogen and oxygen) of precipitation, river water and groundwater were examined with the aim of assessing the groundwater characteristics in Kathmandu valley. Stable isotope values of groundwater and river water were within the range of precipitation samples in the study area. The local meteoric water line was close to the global meteoric water line and isotopic composition showed clearly the altitude and amount effects in river water. Shallow groundwater was isotopically heavier and chemically (e.g. Cl⁻, Na⁺, NO₃⁻) enriched than deep groundwater, and it was mainly recharged from direct infiltration of the local precipitation. A spatially varied and widely ranged isotope values of deep groundwater indicated that groundwater system varied within the basin. Moreover, groundwater characteristics were distinguished clearly between the northern and central groundwater within the study area. The northern groundwater was isotopically lighter and lower in dissolved salt concentration. This groundwater was recently recharged and source of recharge was considered from the precipitation in higher altitudes of mountain areas. But, the study showed the central deep groundwater was poorly recharged and relatively older water. Stable isotope values were varied insignificantly within seasons, thus immediate effects of monsoon was less apparent and indicated the significant groundwater travel time of recharge in the study area.

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