

CURRENT PROJECTS

GeoQuEST collaboration between UOW and Hohai University, China on the isotopic applications in groundwater recharge studies.

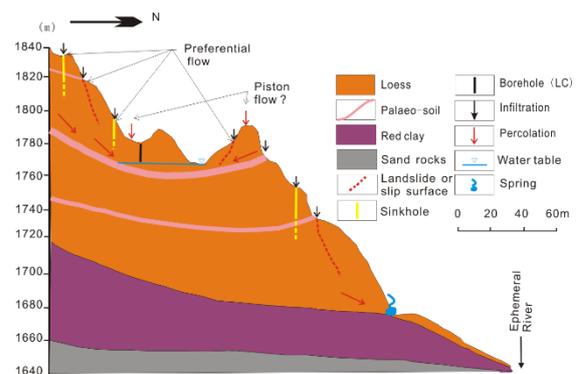
Understanding groundwater recharge mechanisms is important for the better management of water resources for many communities. An example is the groundwater in shallow loess aquifers in high mountain-hills in the western Loess Plateau in China which is almost the sole water resource for local residents.

However, the question about how the loess groundwater naturally circulates in these high mountain-hills, characterised by low precipitation and high potential evaporation, remains unclear. Through GeoQuEST, UOW researchers have been able to assist in understanding groundwater recharge mechanisms better through isotopic analysis and interpretation with the collaboration of researchers at Hohai University. An improved understanding of these mechanisms provides the capacity to plan appropriate and improved sustainable management practices

The objectives of this study are to evaluate the application of hydrogen and oxygen isotopes to (1) examine seasonal variations of the isotopic composition of precipitation and shallow groundwater, and (2) uncover the mechanism of groundwater recharge in high mountain-hills. Results from two-years of monitoring data show a difference in the stable isotopes for groundwater and local precipitation between the winter and summer periods. Similar to precipitation, stable isotopes in groundwater are observed to be depleted in winter and enriched in summer, particularly in oxygen isotopes. The results highlight that local precipitation is the only possible recharge source for groundwater in shallow loess aquifers. Seasonal or annual recharge

from local precipitation maintains the groundwater resource in the shallower loess aquifer. In addition to possible vertical slow percolation of soil water through the unsaturated zone, rapid groundwater recharge mechanisms have been identified as seasonal preferential infiltration through sinkholes, slip surface or landslide surface, and through the interface of loess layer and palaeo-soils. Most groundwater can be recharged after a heavy rainy season.

GeoQuEST has made a financial contribution towards building a long term relationship and collaboration between UOW and Hohai University for important groundwater research such as this investigation. A paper prepared by the joint university researchers is currently in press as a result of this research.



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