

Award-winning paper in 2012

Papers published in *Water Management* are eligible for awards from the Institution of Civil Engineers. Papers from any of the ICE journals can be nominated for several awards. In addition, each journal has awards dedicated to their specific subject area.

On Friday 18 October 2013, ICE president Barry Clarke presented an award to the following paper published in *Water Management* in 2012. The editorial panel nominated their best papers and an awards committee chaired by David Balmforth allocated the awards.

Robert Alfred Carr Prize

The Robert Alfred Carr Prize, presented for the best paper published in *Water Management*, was awarded to Wu *et al.* (2012).

Abstract

A geological and hydrogeological survey was performed in the upper alluvial and proluvial fan and the northern mountain area of the Chaobai River in Beijing. Samples of local precipitation, surface water and groundwater (including spring discharges, groundwater from the fractured bedrock, and shallow and deep groundwater of the alluvium) were collected and analysed to assemble hydrochemical and isotopic data. Q-mode hierarchical cluster analysis (HCA) was used to classify the groundwater samples from multiple aquifers into objective groups. Two groups and six subgroups with distinct groundwater recharge sources, flowpath histories and geochemical evolution histories were identified. Inverse geochemical modelling was adopted to study the deep

groundwater chemical evolution. Hydrochemical data and isotopic data on ^2H , ^3H and ^{18}O were used to evaluate groundwater recharge, flowpath histories and geochemical evolution, and ^{87}Sr was used to provide further insight into groundwater recharge sources and flow directions. It was found that particularly in areas of groundwater cones of depression, the deep alluvial groundwater may be partly derived from the groundwater of the underlying fractured bedrock. The phreatic, or unconfined, groundwater within the northern area of the alluvial and proluvial fan is sustained mainly by the lateral flow of groundwater from the piedmont regions and by recharge from surface water bodies such as the Miyun reservoir. The shallow alluvial groundwater within the central and southern areas of the alluvial and proluvial fan is recharged primarily by the local precipitation and agricultural irrigation. The deep alluvial groundwater within the central and southern areas of the fan is sustained chiefly by the flow of groundwater from the northern area of the fan or from the underlying fractured bedrock. Methodologies adopted in this work may be useful to future investigation of groundwater in multiple aquifer systems similar to this area.

REFERENCE

Wu D, Wang J, Lin X and Hu Q (2012) Recharge processes and groundwater evolution of multiple aquifers, Beijing, China. *Proceedings of the Institution of Civil Engineers – Water Management* **165**(8): 411–424, <http://dx.doi.org/10.1680/wama.10.00113>.