Geophysical Research Abstracts
Vol. 14, EGU2012-1234-1, 2012
EGU General Assembly 2012

Identifying recharge pattern using stable isotopes of rainfall in semi arid subtropical northwest Australia

S. Dogramaci, G. Skrzypek, W. Dodson, and P. Grierson
Australia (shawan.dogramaci@riotinto.com)

The water resources in the semi-arid subtropical Hamersley Basin, is currently subject to increasing pressure from altered hydrology associated with mining activities as well as water abstraction for regional development. Sustainable water management across the Basin therefore must be underpinned by an understanding of the factors that constrain water supply in arid zones. This study used stable isotopic composition of rainwater, groundwater, and surface water to demonstrate the importance of evaporation of rain droplets during rainfall events. We clearly show the importance of the so-called "rain out" effect at the regional scale. We also developed a local meteoric line to determine the recharge dynamics to the aquifers in the Hamersley Basin. We found that δ^2H and δ^{18}O values for rainfall events $>$20 mm were consistent with fresh groundwater, suggesting that groundwater recharge primarily occurs during intense and high volume rainfall events. The chemical composition and δ^2H and δ^{18}O values of rain, surface and groundwater were also used to develop a model for the chemical evolution of water from rainfall to fresh groundwater and ultimately highly saline groundwater.