



## **$^{39}\text{Ar}$ groundwater dating of a coastal aquifer in the Nam Dinh Province, Vietnam**

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In the south of Nam Dinh Province, Red River Delta, Vietnam, fresh Pleistocene groundwater has been identified to exist next to brackish pore waters in the Red River area (WAGNER et al. 2011). Extensive exploitation of the fresh water results in decreasing groundwater heads and migration of brackish water towards the freshwater (WAGNER et al., 2012).

In order to understand the dynamics and origin of the fresh and saltwater and to predict the future evolution of the resource an extensive investigation using environmental tracers has been carried out.  $^{39}\text{Ar}$ ,  $^{85}\text{Kr}$ ,  $^{3}\text{H}/^{3}\text{He}$  and stable noble gas measurements have been used for groundwater dating. Stable isotopes and other geochemical parameters (stable isotopes of the water molecule, water chemistry and gas composition) provide crucial information about the genesis of the water.

Groundwater ages are modern in the recharge area and increase to  $> 1000$  years towards the coast and northwards based on the  $^{39}\text{Ar}$  data ( $T_{1/2}$ : 269 years). Depleted stable noble gas concentrations correlate with high concentrations of dissolved methane suggesting degassing due to the high methane partial pressure. Physical modelling of the degassing process (AESCHBACH-HERTIG et al., 2008) supported by concentrations of accumulated radiogenic  $^{4}\text{He}$  indicates that diffusion controlled the observed degassing at a late stage of the groundwater evolution path.

### **References**

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