

Flow system of confined groundwater and its recharge mechanisms in the Bangkok metropolitan area, Thailand

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Intensive groundwater withdrawals around Bangkok metropolitan area since 1970's, Thailand, have resulted in decline of water level and land subsidence, as in other mega cities in Asia. To reveal groundwater flow system and recharge mechanisms under human impacts, measurements of hydraulic head and isotopic compositions of groundwater in confined aquifers down to 600 m were carried out in June, 2006, using 88 observation wells. In the study area, eight confined aquifers are found. Hydraulic head measurements showed that southeastward flow was dominated in each aquifer, while westward component was strengthened in aquifers deeper than 100 m because of groundwater pumping in the western part of the area. Isotopic data indicated that vertical mixing between aquifers exists in urban sections although groundwater is likely supplied by horizontal flow rather than vertical flow even in such sections. Hydraulic head and isotopic data enabled us to estimate recharge zone for unconfined groundwater, though further investigations (for instance, on inter-annual variation in isotopes in precipitation and/or saline water intrusion during early Holocene marine transgression) are needed to confirm the reliability of the estimation.