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Anthropogenic effect on groundwater flow system in Bangkok metropolitan area, Thailand

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Multi tracers approach using CFCs and stable isotopes was applied to investigate an anthropogenic effect on the groundwater in Bangkok, Thailand. The CFCs concentrations were observed in the deep groundwater at the depth of 200 m in the regions where the drawdown of the groundwater level was clearly monitored in Bangkok metropolitan area. This suggests a vertical groundwater recharge is induced and a mixing of the shallow and deep groundwater occurs due to the excess pumping up.

A numerical simulation was conducted to present the mixing of the shallow groundwater into the deep groundwater due to the induced recharge. The mixture ratio of the shallow groundwater containing the CFCs in the deep groundwater was estimated to be approximately 10%.

The mixture of the shallow and deep groundwater should cause an underestimation of the average residence time of the deep groundwater to be approximately 1000 years.

Keywords: Groundwater flow system, Anthropogenic effect, Induced recharge, CFCs, Bangkok