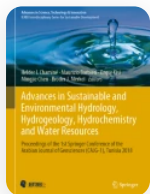


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Numerical Simulation of Groundwater and Surface Water Interaction and Particle Tracking Movement Due to the Effect of Pumping Abstraction of Lower Muda River

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(CAJG 2018)

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Abstract

This study was inspired from the Kedah and Penang water crisis with an objective of solving the problem by applying the conjunctive Riverbank Filtration (RBF) technique. In particular, the RBF technique will improve the water security and sustainability of the water resources. The RBF technique will be exploited in this paper via a case study model, including the evaluations of the effects of groundwater pumping and RBF operation relative to the installation of wells. This study also investigated the impact of pumping rate on flow paths, travel time, the size of the pumping and capture zone delineation, and groundwater mixing within a pumping well. Numerical modeling packages, MODFLOW and MODPATH (particle tracking), were used in these investigations, where the proposed method performed infiltration safely and achieved the ideal pumping rate. The results indicated that the migration of river water into the aquifer is generally slow, which depends on the pumping rate and the distance of the well from the river. The water arrived at the well by the end of the pumping period (1–5 days) at 1054.08, 1238.62, 887.064, 1441.34 m³/day for test wells TW1, TW2, TW3 and TW4, located 5, 10, 15 and 20 m, respectively, from the river. During the 3-day pumping period, 37.5, 23, 21 and 11% of the water pumped from the TW1, TW2, TW3 and TW4 wells was river water, and for pumping periods of 8, 13, 14 and 27 days from TW1, TW2, TW3 and TW4, 100% was river water.

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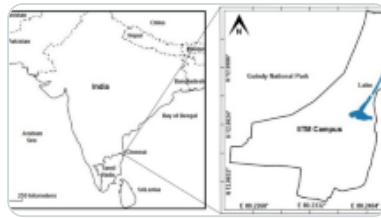
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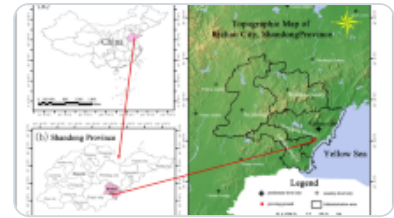
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References

1. Yusoff, I., Ismail, W.M.Z.W., Rahim, B.E.A.: Simulation of horizontal well performance using Visual MODFLOW. Environ. Earth Sci. <https://doi.org/10.1007/s12665-012-1813-x1590> (2012)
2. Shamsuddin, M.K.N., Sulaiman, W.N.A., Suratman, S.: Groundwater and surface-water utilisation using a bank infiltration technique in Malaysia. Hydrogeol. J. 22(3), 543–564 (2014)
3. Chen, X.H.: Migration of induce–infiltrated stream water into nearby aquifer due to seasonal groundwater withdrawal. Groundwater 39(5), 721–728 (2001)
4. Shamsuddin, M.K.N., Suratman, S., Zakaria, M.P., Aris, A. Z., Sulaiman, W.N.A.: Using particle tracking as tool sustainable bank infiltration techniques: a case study in an alluvial area. Arab. J. Geosci. 8(3), 1571–1590 (2015)

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