

Seawater intrusion overshoot – possible occurrence and cause

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ABSTRACT

A number of numerical modelling studies of transient sea-level rise and seawater intrusion have reported an overshoot phenomenon, whereby the freshwater-saltwater interface temporarily extends further inland than the eventual steady-state position (Watson et al., 2010; Chang et al., 2010). Recently, Morgan et al. (2013) used physical sand tank modelling to confirm that seawater intrusion overshoot is a physical process. As previous studies considered only instantaneous sea-level rise scenarios, in this study we assess whether seawater intrusion overshoot could occur under gradual sea-level rise scenarios commensurate with those predicted by the Intergovernmental Panel for Climate Change (IPCC, 2007). In addition, the cause of seawater intrusion overshoot is explored. Modelling is carried out using the MODFLOW Seawater Intrusion (SWI2) Package (Bakker et al., 2013) and SEAWAT (Guo and Langevin, 2002).

Keywords: Seawater intrusion, sea-level rise, sharp interface, density-dependent modelling

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