



Efficient regional seawater intrusion modeling with the SWI package

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The SWI package was developed to simulate seawater intrusion in coastal aquifers with MODFLOW. The main advantage of the SWI package is that one aquifer can be represented with one model layer so that the evolution of seawater intrusion may be simulated in a timely manner on a regular Mac or PC. SWI may be applied to simulate seawater intrusion with an existing MODFLOW model through the addition of just one input file. The salinity distribution is represented by one or multiple interfaces, or by one or multiple iso-concentration surfaces. SWI is envisioned to be complimentary to codes that solve the coupled flow and transport equations, such as SEAWAT and SUTRA: SWI may be used to simulate regional flow including density effects, and other codes may be used to simulate local seawater intrusion, including dispersive mixing. Since its first release in 2004, SWI has been benchmarked against several other codes and was shown to perform well, even when a moderate amount of dispersion was included in the simulations. SWI has recently been implemented in MODFLOW2005. The new implementation includes a number of enhancements such as variable time stepping, separate budgets for fresh and salt water, and the ability to simulate upconing through aquitards. In the presentation, the main features of the SWI package are discussed, the new capabilities are showcased, and several examples are presented.