

Recent Updates to the SEAWAT Computer Program

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ABSTRACT

The SEAWAT computer program, based on MODFLOW and MT3DMS, is developed and released by the U.S. Geological Survey. The program has been continuously updated and improved since it was first released in 2002. An updated version of SEAWAT is presently under development. This updated version is based on the latest MODFLOW version (MODFLOW 2005 Version 1.11). As part of this update, the underlying program is being redesigned to optionally allow conservation of fluid volume for situations where density variations are moderate. This is an alternative to solving the full, extended Oberbeck-Boussinesq form of the mass conservation equations. For most saltwater intrusion applications, the extended Oberbeck-Boussinesq terms can be excluded due to the slight density variation of only about 2.5 percent between freshwater and seawater. In these situations, the updated version can be used with additional MODFLOW packages that were not supported in previous SEAWAT versions. These packages include the Stream (STR) Package, Version 2 of the Multi-Node Well (MNW2) Package, Segmented Evapotranspiration (ETS) Package, Drains with Return Flow (DRT) Package, and the Surface Water Routing (SWR) Process. The updated version also contains several other enhancements, including new flexibility for entering solute concentrations through MODFLOW package auxiliary variables, better design of MODFLOW and MT3DMS flow and transport time steps, an alternative storage formulation that improves convergence characteristics for wetting and drying problems, and improved numerical approximations for water table conditions. These enhancements will extend usage of SEAWAT to a wider variety of complex groundwater flow problems.

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