

Lakes example problem

The Lakes example problem demonstrates the formation, coalescence, and splitting of lakes that form on the surface of a three-dimensional (3D) groundwater model. As they evolve, the lakes exchange water and solute with the groundwater model. The problem setup is described in detail in the SUTRA 3.0.0 documentation:

Provost, A.M., and Voss, C.I., 2019, SUTRA, a model for saturated-unsaturated, variable-density groundwater flow with solute or energy transport—Documentation of generalized boundary conditions, a modified implementation of specified pressures and concentrations or temperatures, and the lake capability: U.S. Geological Survey Techniques and Methods, book 6, chap. A52, 62 p., <https://doi.org/10.3133/tm6A52>.

Input files

A complete set of input files for the example problem is provided:

- SUTRA.FIL – Contains file assignments for the remaining input and output files.
- Lakes.inp – Main input (INP) file.
- Lakes.ics – Initial conditions (ICS) file.
- Lakes_pump.bcs – Time-dependent boundary conditions (BCS) file for pumping.
- Lakes_solute.bcs – Time-dependent boundary conditions (BCS) file for solute.
- Lakes.lkin – Main lake input (LKIN) file.
- Lakes.lkbc – Lake-boundary condition interactions (LKBC) file.

Output files

The output files generated by this example problem are listed below:

- Lakes.lst – Main output (LST) file.
- Lakes.nod – Nodewise results output (NOD) file.
- Lakes.ele – Elementwise results output (ELE) file.
- Lakes.bcof – Fluid source/sink boundary condition output (BCOF) file.
- Lakes.bcop – Specified-pressure boundary condition output (BCOP) file.
- Lakes.rst – Restart output (RST) file.
- Lakes.lkn – Lake-number output (LKN) file.
- Lakes.lkh – Lake hierarchy output (LKH) file.
- Lakes.lkbu – Lake budget output (LKBU) file.
- Lakes.lkst – Lake stage output (LKST) file.
- Lakes.lrst – Lake restart output (LRST) file.
- Lakes.smy – Summary output (SMY) file.

Execution

Before running the example problem, you may wish to save the existing output files for later comparison with your new results. To run the simulation, run the batch file “RUNSUTRA.BAT” (which calls the SUTRA executable in the “SUTRA_3_0/bin” subdirectory).