Review of MODFLOW-2000 and Packages

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MODFLOW2000 (MF2K) is the most recent version of the U.S. Geological Survey's public domain MODFLOW software for simulating flow in saturated porous media in three dimensions with a finite difference grid.

A Geraghty and Miller survey of more than 5,000 groundwater modelers conducted in 1993 indicated MODFLOW was the most widely used groundwater model in the world. More than 23,000 copies of MODFLOW were downloaded from the main USGS web site from 1990 to 2000. Its popularity has continued, in part due to the modularity of the program and the resulting ability of USGS and others to add capabilities.

MF2K includes observation, sensitivity and parameter-estimation options with a convenient "Parameter" approach that facilitates model setup. A wide range of conditions can be represented using "Packages," including many recently released ones: The **Hydrogeologic-Unit Flow** (HUF) **Package** facilitates connection with hydrogeologic framework models such as EarthVision by populating the model grid with hydraulic parameters using defined hydrogeologic units. The **Multi-Node Well** (MNW) **Package** distributes flow in wells that intersect multiple model layers (for horizontal or angled wells, multiple nodes) and accounts for reduced pumpage caused by drawdown at the pumping well. The **Geometric Multi-Grid** (GMG) **Package** is efficient for solving large problems and is the first part of MODFLOW to be written in C rather than FORTRAN. The **StreamFlow-Routing** (SFR, replaces STR) **Package** routes surface water to streams and lakes, adjusting the river stage as stream discharge changes, such that flux to and from the groundwater system adjusts to the changing stage. The **Subsidence and Aquifer-System Compaction** (SUB3) **Package** simulates elastic compaction and expansion, and inelastic compaction of compressible fine-grained beds within the aquifer. Unsaturated flow packages are due out soon.

Some simple pre- and post-processing programs for MF2K are available from the USGS. These include MF2KI, a graphical user interface; GW_CHART, a program for evaluating model fit to observations and sensitivity analysis; and ModelViewer, a program to contour simulated heads. More powerful capabilities are available in a variety of interfaces that require purchase of commercial products. These can be found by searching for "MODFLOW interface" using a Web search engine. These programs facilitate construction of input files and assessment of results, but they may not support the latest MF2K capabilities, and errors in user understanding or bugs in the interfaces could yield misleading results.

Familiarity with MODFLOW text files is important for trouble shooting, for using new MF2K features, and for dealing with unusual modeling situations. The online guide provides a quick way to look up options and input formats and is available on USGS's MF2K Web page, where you can also download documentation, source code, and executables of MF2K and associated programs at no charge.

Visit water.usgs.gov/nrp/gwsoftware/modflow2000/modflow2000.html. Contact Eileen Poeter at epoeter@mines.edu.

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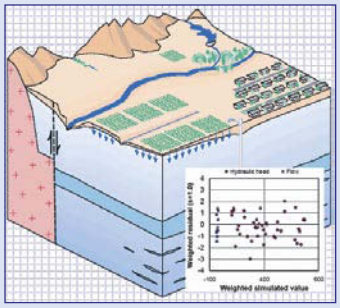

Rating System for graphics:

Excellent

Poor

Ease of Use:	
GUI:	N/A
Application:	
Output/Plotting:	N/A
Documentation:	
Speed:	
OVERALL RATING:	

Best Feature

Flexibility in representing shallow groundwater systems and wide acceptance by the hydrologic and legal communities.

Worst Feature

Transient simulations of thin layers in combination with drying/(re)wetting conditions.

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