DSM2: Delta Simulation Model II

The Delta Simulation Model II (DSM2) is a is a river, estuary, and land modeling system. It is a one-dimensional mathematical model for dynamic simulation of one-dimensional hydrodynamics, water quality and particle tracking in a network of riverine or estuarine channels. DSM2 can calculate stages, flows, velocities, mass transport processes for conservative and non-conservative constituents including salts, water temperature, dissolved oxygen, and trihalomethane formation potential, and transport of individual particles. DSM2 thus provides a powerful simulation package for analysis of complex hydrodynamic, water quality, and ecological conditions in riverine and estuarine systems.

- River - Can simulate riverine systems, and has been extended from Sacramento to Shasta Dam. Has been tested with high flow/stage simulations for flood modeling.
- Estuary - Completely flexible estuary model; stages and flows may be specified at boundary and internal points.
- Land - Includes effects from land-based processes, such as consumptive use and agricultural runoff.

DSM2 can calculate stages, flows, velocities; many mass transport processes, including salts, multiple non-conservative constituents, temperature, THM formation potential and individual particles.

DSM2 currently consists of three modules, all of which come with the current distribution: HYDRO, QUAL, and PTM. HYDRO simulates one-dimensional hydrodynamics including flows, velocities, depth, and water surface elevations. HYDRO provides the flow input for QUAL and PTM. QUAL simulates one-dimensional fate and transport of conservative and non-conservative water quality constituents given a flow field simulated by HYDRO. PTM simulates pseudo 3-D transport of neutrally buoyant particles based on the flow field simulated by HYDRO. PTM has multiple applications ranging from visualization of flow patterns to simulation of discrete organisms such as fish eggs and larvae.

This latest release of DSM2 employs daily channel depletions instead of monthly values as in the previous release. Supporting documents including recalibration memoranda are also available for downloads at the link below. Please email comments or questions to Min.Yu@water.ca.gov .

https://data.cnra.ca.gov/dataset/dsm2-v8-2-1

Downloads

- DSM2 V8.2.1
- DSM2 V8.2.0
- DSM2 Version 8.1.2 Release (11/01/2013)
- DSM2 Source Code (267 MB) (11/12/2013)
- DSM2 Version 8.0.6 Release(11/17/2010)

- DSM2 Version 8.0.4

Calibrations

- DSM2 V8.1.2 Calibration
- 2009 BDCP Calibration (aka Mini-Calibration)
- 1998-2003 Calibration and Validation

Reports & Publications

- 2020 Annual Report
- 2019 Annual Report
- Annual Report Archive
- Branched Lagrangian Transport Model memo from USGS-basis for DSM2 QUAL
- Delta D1641 Water Quality Standards Full Reference
- Delta D1641 Water Quality Standard Summary
- EC, Chloride and Bromide Conversions (Bob Suits, 2001)
- Four Point memo from USGS-basis for DSM2 HYDRO
- QUAL2E Documentation - Basis for QUAL Nonconservative Constituent Kinetics
- South Delta Improvements Project Permanent Barrier Operations

Resources

DSM2 comes with a numerical model and scripting capabilities. It is easier to use the model if you also have a text editor with syntax highlighting, a tool for differencing text files ("diff tool"), a dss viewer and an hdf5 viewer.

- Open Command Window Here is a free "power tool" distributed by Microsoft (the download links are on the right-hand side next to the description of the tool). It allows you to get a command window by right clicking a location in Windows file explorer. The tool is essential for working with DSM2 efficiently.
- Notepad++ is a text editor that works well with DSM2 input data and integrates nicely into the Windows file explorer. We support the editor with syntax highlighting. See the /extras folder.
- DiffMerge is a good free differencing tool for text files. Beyond Compare is an inexpensive commercial product that is intuitive and compares Word files.
- Vista, one of the first graphical tools for examining data in HEC-DSS format, comes with DSM2 in the /dsm2/vista/bin directory.
- HEC-DSSVUE is distributed by HEC and is actively maintained. Most people use DSSVUE as their primary tool with Vista for specific tasks. An Excel add-in for DSS data is also available on the HEC web page.

- HDFView and HDF-Explorer are two independent browsers for the HDF5 file format. This lets you look inside a tide file, one of the outputs of the model. You only need one of them.