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C2VSim: California Central Valley Groundwater-Surface Water Simulation Model

(Web Site Last Updated: March 28, 2016)

Description

The California Central Valley Groundwater-Surface Water Simulation Model (C2VSim) is an integrated numerical model that simulates water movement through the linked land surface, groundwater and surface water flow systems in California's Central Valley. The C2VSim model contains monthly historical stream inflows, surface water diversions, precipitation, land use and crop acreages from October 1921 through September 2009. C2VSim dynamically calculates crop water demands, allocates contributions from precipitation, soil moisture and surface water diversions, and calculates the groundwater pumpage required to meet the remaining demand. The model simulates the historical response of the Central Valley's groundwater and surface water flow system to historical stresses, and can also be used to simulate the response to projected future stresses.

The C2VSim model can be run with either a coarse finite element grid (C2VSim-CG with 1,392 elements, run-time 6 minutes) or with a fine finite element grid (C2VSim-FG with over 35,000 elements, run-time 6 hours). For both versions, the elements are grouped into 21 water budget subregions. Hydrologic parameters were calibrated to match observed surface water flows, groundwater heads, groundwater head differences between well pairs, and stream-groundwater flows for the period between September 1975 and October 2003.

The C2VSim-CG model is being used as the basis for the groundwater flow component of CalSim 3, and has also been used to investigate how Sacramento Valley water transfers may affect Delta flows and how an extended drought may impact groundwater levels. Both C2VSim versions will also be useful tools for integrated regional water management plans, planning studies, groundwater storage investigations, assessing infrastructure improvements, evaluating ecosystem enhancement scenarios, conducting climate change studies, and assessing the impacts of changes to water operations.

C2VSim was developed using the [Integrated Water Flow Model \(IWFM\) Version 3.02](#).

Coarse Grid C2VSim Model Version R374 (C2VSim-CG_R374)
(Released: June 28, 2013)

• **Model Files**

- [C2VSim 3.02-CG Water Years 1922-2009](#)
- [C2VSim 3.02-CG Water Years 1973-2009](#)

• **Documentation**

- [Brush, C.F., Dogrul, E.C., and Kadir, T.N. June 2013.](#) Development and Calibration of the California Central Valley Groundwater-Surface Water Simulation Model (C2VSim), Version 3.02-CG.
- [Brush, C.F., and Dogrul, E.C. June 2013.](#) User Manual for the California Central Valley Groundwater-Surface Water Simulation Model (C2VSim), Version 3.02-CG. [Addenda](#)
- [Brush, C.F. June 2013.](#) Historical Rim Inflows, Surface Water Diversions and Bypass Flows for the California Central Valley Groundwater-Surface Water Simulation Model (C2VSim), Version 3.02-CG.
- [Brush, C.F. March 2013.](#) Hands-On Tutorial for the California Central Valley Groundwater-Surface Water Simulation Model Coarse Grid, version 3.02 (C2VSim v3.02-CG).

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