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Groundwater Spreadsheets: a powerful learning tool in Hydrogeology

Carlos E. Molano C. (1)

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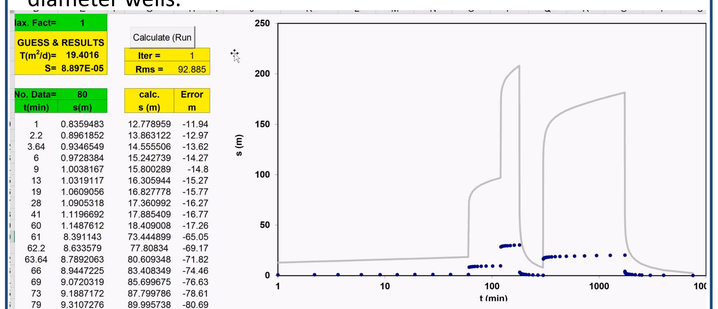
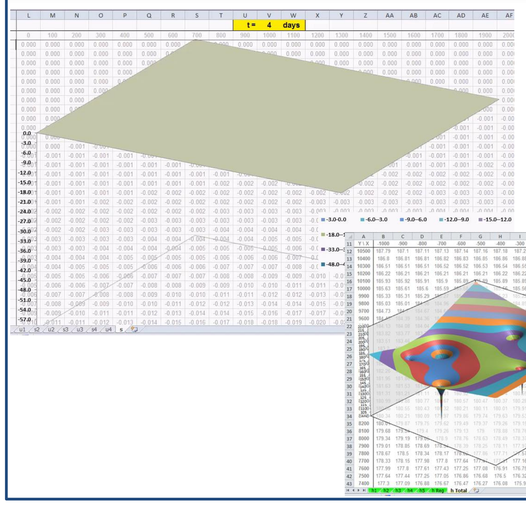
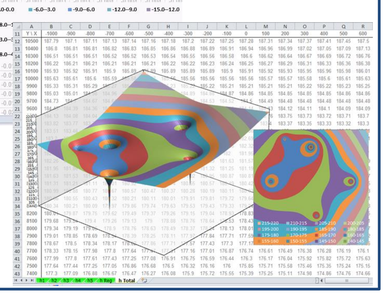
Spreadsheets is a simple tool for solving efficiently groundwater flow and pollution analytical and numerical problems. It's a cheap, easy to use, and a powerful tool for Hydrogeology teaching research and practice. It also helps to understand concepts and solve practical day-to-day groundwater problems. No complex programing is required and it is suitable for use by students, practitioners and researchers.

Convolution is suitable for spreadsheets to solve a wide range of superposition problems with input varying arbitrary in time or space. This procedure can be applied for pumping tests analysis with discharge rate varying in time, for example for step or intermittent tests, which can include well storage in large diameter wells.

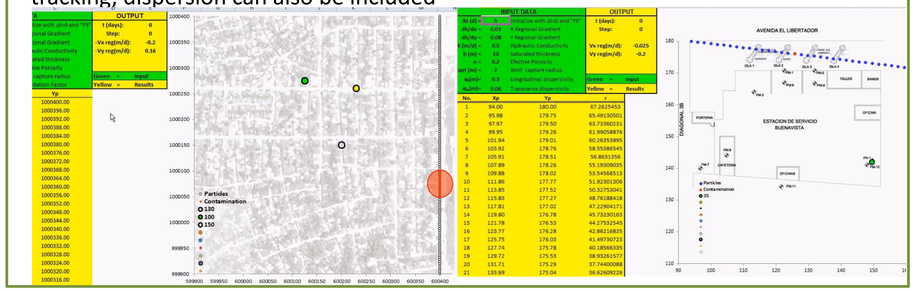


Superposition can also be applied for well field analysis with input varying in space (steady state) and varying in time and space (transient state).

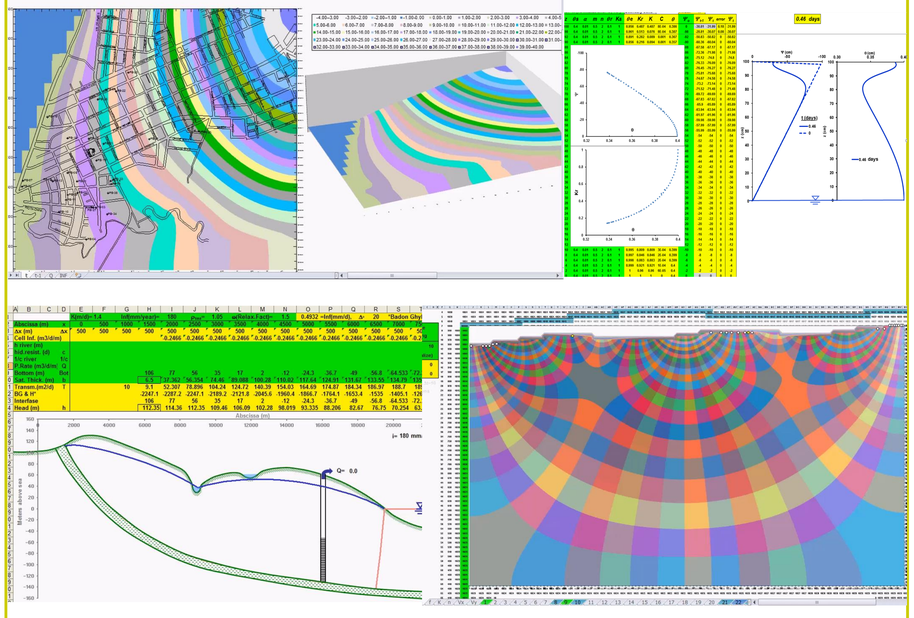




Convolution coupled with forward and inverse particle tracking are implemented in spreadsheets for advective contaminant transport problems, risk analysis, delineation of capture zones and forensic hydrogeology; furthermore, with random walk particle tracking, dispersion can also be included

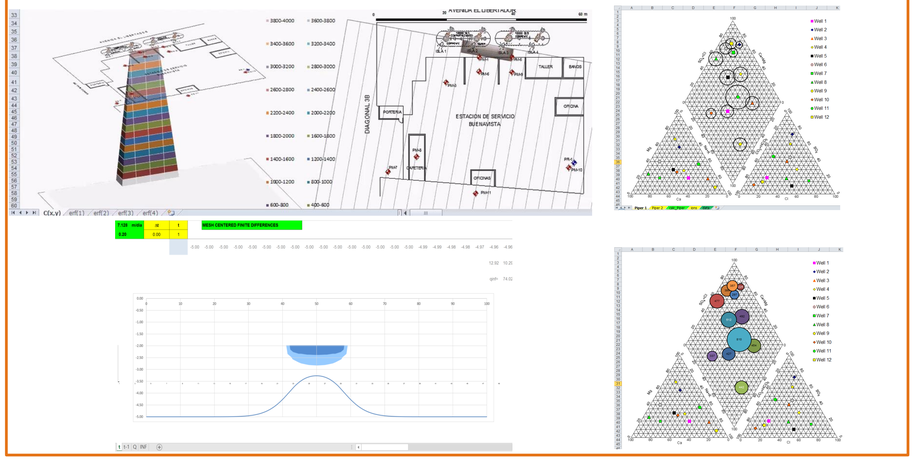


Spreadsheets are also suitable for 1-D, 2-D and 3-D finite difference models to simulate well fields, sea water intrusion, the effect of climate change in groundwater dependable ecosystems, Flow System Analysis and Flow in partially saturated soils



1D vertical finite diference models can be coupled with 2D or 3D groundwater flow models including soil compresibility to simulate land subsidence (México City).

There are hundreds of more groundwater applications using spreadsheets; hydrogeochemical analysis, 1D, 2D, and 3D Groundwater contamination and Sustainable Urban Drainage Systems SUDS are some examples.



Spreadsheets: https://sites.google.com/a/hidrogeocol.com.co/carlos_molano/Home

Tutorials: https://www.youtube.com/user/SolracOnalom

(1) cmolano@uniandes.edu.co, Department of Civil and Environmental Engineering, Los Andes University, Bogota, COLOMBIA