

## **Three-Dimensional Aquifer Mapping Using Indicator Geostatistics**

Ritzi, R.W. Jr.

Department of Geological Sciences, Wright State University, Dayton, OH 45430; E-mail: [rritzi@wright.edu](mailto:rritzi@wright.edu)

The indicator geostatistics provides a method for three-dimensional aquifer mapping with quantitative aspects that are desirable in hydrogeologic application. With this method we generate maps that honor the proportions, the mean and variance in the thickness of unit types, their lateral correlation, and their three dimensional juxtapositioning relationships (cross-transition probabilities). These statistics that are honored are quantified from indicator data sets developed from borhole data. Indicator simulation algorithms generate maps on the grid required for fluid flow and transport simulations. Furthermore, many realizations of such maps can be generated that honor existing data and represent equiprobable interpretations, and thus that can be included in analyses of uncertainty in flow and transport. Here we consider application in studies of the three dimensional distribution of aquifers, and the distribution of permeability facies within aquifers, in buried-valley aquifer settings in the northern mid-continent of North America.