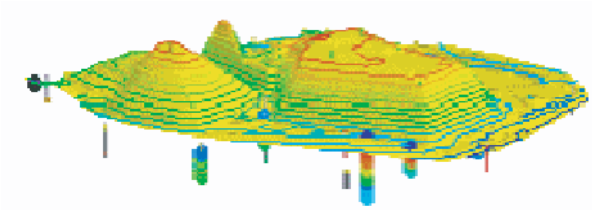
Earth Data INCORPORATED

GROUNDWATER MODELING



Earth Data Incorporated scientists have substantial experience in the development and application of analytical and numerical models of complex groundwater flow and contaminant transport. Digital models describing groundwater flow and contaminant migration can be used for practical studies of wellfield design and scale up, including details such as well interference, off-site receptor risk analysis, and wellhead protection studies. The models include groundwater flow, mass balances and chemical reaction mechanisms of varying degrees of complexity. To address conceptual limitation, closed form analytical solutions are used to predict aquifer response in simple hydrogeologic systems whereas whereas well interactions and/or complex chemical mechanisms are generally studied with more robust numerical modeling tools.

Earth Data Incorporated does not believe that computer simulations alone can be used as a deterministic tool to yield absolute answers. Instead, Earth Data Incorporated believes that:

Models are tools, they may raise more questions than they answer; Modelers do not prescribe an answer, but work with and for those who know the site best and seek to incorporate their conceptualization of site geology and groundwater interactions into a consistent numerical simulation; and Models and the modeling process should be founded on a firm geologic/hydrogeologic conceptual model and built using regimented and well documented procedures.

Utilizing these principals, Earth Data Incorporated applies the modeling tool to:

- ***Optimize solutions***
- ***Extrapolate trends (prediction)***
- ***Demonstrate processes (Natural Attenuation)***
- ***Illuminate inconsistencies in interpretations***
- ***Help to find data gaps***
- ***Visualize complex interactions***

GMS

Earth Data Incoporated utilizes and adapts diverse modeling tools as appropriate on a project specific basis. Existing groundwater flow codes utilized by Earth Data Incorporated include: MODFLOW-2000 which describes steady state as well as transient groundwater flow in a single or multi-layered aquifer system with various possible boundary conditions; FEMWATER, which describes groundwater flow in a manner similar to MODFLOW, but utilizes a finite element approach which is useful in heat transfer or density dependent (such as salt-water intrusion) studies; MT3DMS and RT3D which describe contaminant migration and attenuation within a groundwater flow system with differing degrees of relative transport, adsorption, diffusion, and advection.

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