

CHAPTER 2

Modeling Purpose and Conceptual Model

COMMON MODELING ERRORS

- The modeler constructs a model to learn something about the system without defining a specific purpose or framing specific questions. Although modeling without a well-defined purpose might be helpful in the initial stages of an interpretive generic modeling exercise, even a generic model benefits from a well-defined purpose. The purpose helps the modeler select the processes, parameters, and level of detail to include in the conceptual and numerical models.
- The modeler becomes enamored with a conceptual model. Field data alone rarely support the selection of a single conceptual model, especially after project resources are depleted. Yet, a single conceptual model is often selected for convenience and the modeler might be reluctant to let go of the favored model, especially after significant investment of resources. However, during model calibration the presence of recalcitrant misfit and optimal calibrated parameter values that are at the extreme of a hydrogeologically reasonable range may require revising the conceptual model, or selecting an alternative conceptual model, and repeating the modeling process.
- The modeler builds a detailed “real-world” conceptual model that is inappropriately complex for constructing a numerical model given the modeling purpose, budget, and time available. In some scientific applications constructing the conceptual model is the sole objective; in those cases the conceptual model appropriately includes every possible process and parameter that might influence the outcome. However, in groundwater modeling, the purpose of constructing a conceptual model is to distill the real world to a representative set of processes and parameters that can be simulated in a groundwater flow code and is appropriate to the modeling purpose.