

## CHAPTER 5

# Spatial Discretization and Parameter Assignment

### COMMON MODELING ERRORS

- The grid/mesh is aligned with geographical, site, or political boundaries rather than the primary direction of groundwater flow.
- Nodal spacing is too large around surface water bodies for accurate representation of groundwater–surface water exchange. The characteristic leakage length,  $\lambda$  (Eqn (5.2)), should be used as a guide when designing the nodal spacing around surface water features when it is important for accurate representation of fluxes to and from surface water.
- A MODFLOW-USG unstructured grid is created that violates the CVFD requirement and the modeler fails to use ghost-node correction. The resulting errors in simulated heads and flows are not detected because they do not cause errors in the simulated water budget.
- A structured FD grid with deformed layers is used to represent steeply dipping and folded hydrogeologic units when an FE model that includes non-uniform anisotropy is needed.
- The simulated water table is above the land surface in an area known to be dry land. The modeler failed to check for flooded nodes.
- Values of specific yield are input to represent storage in layers under confined conditions. The modeler incorrectly assumed that specific yield is the appropriate storage parameter for all layers that represent a surficial unconfined aquifer. Rather, model layers are under confined conditions except when a water table is present in the layer. Specific storage (or confined storativity) is the appropriate storage parameter for a confined layer. The error can be avoided by always using convertible layers, which require input of both specific storage (or confined storativity) and specific yield.
- Storativity is input when the code expects specific storage (or vice versa).
- Parameter zone sizes and geometries do not conform to the hydrogeology of the modeled area.
- Point measurements of parameters are assigned to the grid/mesh without upscaling.