

Week 7

7.1. Data Preparation

Physical description of simulation domain

- Topography
- Geological formations
- Boundary conditions

Hydraulic properties

- Conductivity: lab and field measurement, grain size analysis, and literature review.
- Storativity: lab and field measurement, grain size analysis, and literature review.

Discretization of simulation domain

- Assign hydraulic properties to each grid cell
- Assign boundary conditions

Preparation of initial conditions

- Head, moisture
- Flux

Model driving parameters

- Simulation period
- Time step
- Convergence criteria

7.2. Model calibration

The purpose of the model calibration is to evaluate the model capability of reproducing the observed variables such as hydraulic head and flux after the initial successful model execution.

Calibration targets

- Hydraulic head
- Flux (e.g., streamflow, baseflow)
- Moisture
- Concentration

Compilation of observed data or derived data for calibration targets

- Historical records: head, streamflow, concentration
- Derived data: baseflow, rainfall induced recharge

Calibration process - parameter optimization - parameterization

The process is achieved by finding a set (or more than one set) of parameters, boundary conditions, and stresses that would produce simulated variables (e.g., head and flux) that match wells with the observed or derived data under acceptable errors.

Calibration methods

- Trial-and-error calibration

- Automatic calibration

Calibration evaluations

- Graphic comparison

- Qualitative measurements

 - The mean error (ME)

 - The mean absolute error (MAE)

 - The root mean squared error (RMS)

Sensitivity analysis on the effect of variation in parameters on the calibration

Non-uniqueness of numerical solutions