



Effective Ground-Water Model Calibration, with Analysis of Data, Sensitivities, Predictions, and Uncertainty using Local and Global Methods.

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When: 2010, Wednesday, 30 June, 9:00 – Friday, 2 July, 15:30

Where: Roma Tre, Building “Blocco Aule” – Class Room - Computer Lab

WEDNESDAY June 30 09:00-18:00 Introduction, simulation, and sensitivity analysis

01. Introduction (Hill)

Outline of course

Introduction to model calibration. Or, what do I do with this model and all this data!?!

02. Software for simulating groundwater flow (LaVigna-MODFLOW overview; Hill-ModelMuse and ModelViewer)

03. Simulation: Does the model reflect the real world at all? (Hill)

Parameters: What parameters????

Simulated values: Use ModelMuse to run MODFLOW

Observations: Define and weight with ModelMuse and ModelMate

Objective function: One measure of model fit to observations.

Exercise 3.3: Check the model fit and try to improve it the old fashioned way!

04. Sensitivity analysis: What in the model matters? (Hill)

Exercise 4.1: Identify important observations and predictions using local methods

THURSDAY July 1 09:00-18:00 Regression, evaluation, and prediction

05. Regression and best-fit parameter values: What is “best fit”? Is it good? (Hill)

Exercise 5.1: Two-parameter model: Present selected results. (Hill)

Exercise 5.2: Six-parameter model. Find the best-fit parameter values!

06. Evaluate model fit to observations (Hill)

Exercise 6.1: Overall measures

Exercise 6.2: Always look at graphs!!!

07. Evaluate estimated parameter values and uncertainty. Does this make sense? (Hill)

Exercise 7.1: What is behind this “best fit”???

08. Prediction: The model’s a crystal ball, right? (Hill)

Exercise 8.1: The drawdown is where?

FIELD APPLICATION – A model calibration case study from Italy (La Vigna)

FRIDAY July 2 08:30-15:30 Uncertainty, and data needs assessment

08. Prediction! The model's a crystal ball, right? (Hill) (continued)

Exercise 8.2: Uncertainty: can we get rid of it? Using OPR and PPR to find out.

09a. Calibrating transient models (LaVigna)

09b. Calibrating transport models (Hill)

FIELD APPLICATION -- Naval Air Warfare Center (NAWC) Toxics Site, New Jersey, USA – Use inverse modeling and multiple aquifer tests to calibrate a local-scale model of ground-water flow in contaminated fractured sedimentary rocks. (Hill)

Use OPR and PPR to identify observations and parameters important to flux through a bioaugmented region of the aquifer. (Hill)

Special topics:

Global sensitivity and uncertainty methods

Weighting issues: nondetects and large range of values

Calibration and Prediction Guidelines, an overview – (Hill)

Issues of computer execution time (LaVigna)

Utility of highly parameterized methods (Hill)

FIELD APPLICATION -- Spokane Valley-Rathdrum Prairie Aquifer in Washington and Idaho: Use of zones and pilot points. (Hill; from Hsieh and others, report USGS SIR 2007-5044)

Summary comments (Hill)

End 15:30