

On-site/Online Course 2023

Basic Model Calibration with ModelMuse and PEST

February 13-21, Italy

Course overview

The course covers the basic steps of model building with [ModelMuse](#) and calibration through the [PEST](#) suite. The course follows a “learning by doing” approach, being mainly made up of practical workshops. The theoretical background is extremely simplified and attempts to provide a comprehensive overlook without going into too much details. It targets those who have no or little experience in numerical modelling and calibration and would like to start “savoring” the matter. It takes many years to become a modeller and whatever course can only try to transmit the message that, even if difficult, it is worth trying. After that, a huge individual effort is required.

The course is organized in a **pre-course online session** (dedicated to solve any software installation issue) and 5 days which can be attended both **online or onsite** in our office. All lessons **will be recorded and available** after the course.

The course will close with real-world examples or the discussion of your own cases. An assignment will be proposed as homework. This would test the assimilation of the course contents and allow to encounter the most common obstacles for beginners. Assistance is provided in case you get totally stuck and final results will be checked together at your own pace.

What is included

- Access to live lessons (both physically and remotely)
- Software and installation instructions provided before the course
- Material to carry out the exercises
- Access to our [e-learning platform](#) to watch again the recorded lessons until June 30, 2023
- *APC credits* for Italian Geologists

Remote/Live Attendance

The course can be attended remotely or on site. The venue is located in [Vetralla \(VT\)](#), Italy (60 km from Rome).

Costs

SYMPLE is an Accredited Training Organization, VAT is not due (art. 10 DPR 633/72).

- Regular: 500 €
- IAH/SGI: 400 €
- Students/ECHN: 300 €
- Attendees of the [SYMPLE School](#): 200 €
- Installments available

Other opportunities to “meet” PEST

- A more advanced [PEST course](#) will be held with John Doherty in March, 2023.
- See [roadmaps](#), [videos](#), [webinars](#), [tutorials](#) and [frequently asked questions](#) that are accessible for free through the [PEST web pages](#).
- Further training material is available on the [GMDSI web pages](#).
- Training in PEST is also included in the [Second PEST conference](#), La Jolla, CA.
- A PEST course will also be held in [France](#) in [April, 2023](#).



[Registration form](#)



Seats are limited to 20 participants
Register preferably before January 19th, 2023
in order to receive the software installation
instructions on time

February 13-21, Italy

Course Programme (in Central European Time)

February 13 (2.30-3.30pm)

Preliminary session (only on-line)

- Instructions for installing the software and access the e-learning platform
- A test model is provided to check that everything runs fine

February 15 (10 am -1 pm; 2-5 pm)

General Overlook about Modelling

- How building a model and calibrating can be *parallel* rather than *subsequent* phases
- MODFLOW basics

Workshop 1

Model building in ModelMuse

February 16 (10 am -1 pm; 2-5 pm)

General Overlook about Model Calibration

- Principle of Parsimony and highly parametrized methods
- PEST in simple words
- Is model calibration really worth?

Workshop 2

MODFLOW 6 settings in ModelMuse. Getting familiar with the input/output files. Setting up observations and parameters.

February 17 (10 am -1 pm; 2-5 pm)

Workshop 3

Calibration with PEST: traditional approach based on uniform "zones". Sensitivity analysis, parameter correlation and troubles associated

Pilot points

Meaning, pros and cons, strategies and brief review of geostatistics needed to understand them.

February 20 (10 am -1 pm; 2-5 pm)

Workshop 4

Calibration with PEST: pilot point approach (simplified)

Regularization

What is it about and why do we need it?

February 21 (10 am -1 pm; 2-5 pm)

Workshop 5

Calibration with PEST: pilot point approach with regularization (life is good... but it can be better!!)

Example of applications and discussion

Those who wishes are invited to present their problem

Assignment

An optional exercise will be proposed as homework. This would test the assimilation of the course contents and allow to encounter the most common obstacles for beginners. Assistance is provided in case you get totally stuck and results checked together.



SYMPLE is an Innovative Start-up founded in 2021 that intends to **promote and facilitate the understanding, use and evaluation of hydrogeological numerical models through a multidisciplinary program associated with the use of strategies aimed at solving specific problems.**