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Italian Chapter

Ente di Formazione
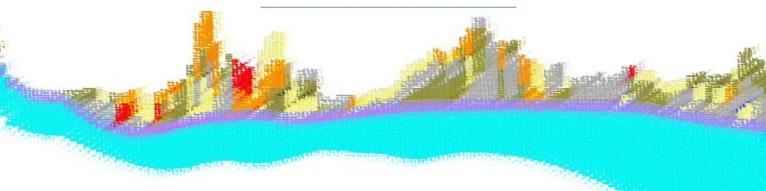CONSIGLIO NAZIONALE GEOLOGI
Accreditato

Blended Course 2024

Introduction to Applied Groundwater Flow Modelling
with
GW Vistas

September 24th – November 8th, 2024

Course overview

The training course *Introduction to Applied Groundwater Flow Modeling* is scheduled to take place in autumn 2024 at the SYMPLE school in Vetralla, Italy, with the option of participating online. The course is divided into three parts: the first is theoretical and entirely conducted online, the second part is a blend of online and on-site attendance, emphasizing practical applications of MODFLOW models. A final session, focused on a pumping test analysis and a dewatering project, will commence on-site and continue online after one month. The entire course will be conducted in English.

The course will cover essential practical criteria necessary for constructing a numerical flow model. This includes topics like defining parameters, boundary conditions and inputs, both in stationary and transient conditions. Practical applications using MODFLOW packages will be demonstrated through explanatory lectures and computer exercises facilitated by the proprietary GUI Groundwater Vistas 8. Each participant will have access to Groundwater Vistas for a duration of 2 months.

To ensure accessibility and flexibility, all course sessions, whether conducted online or on-site, will be recorded. These recordings will be uploaded to our e-learning platform, allowing participants to review the material at their convenience.

Info & Registration

What is included

- Access to live lessons (both in the on-site classroom and remotely)
- Software and installation instructions provided 1 month before the course
- Material to carry out the exercises
- Access to our e-learning platform to watch again the recorded lessons
- *APC credits* for Italian Geologists
- On-site coffee breaks & light lunches

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: 1200 €
- IAH/SGI: 1000 €
- Students/ECHN: 600 €
- Free access for the attendees of the 3rd ed. of the SYMPLE School
- Instalments available

Registration Form

On-site seats are limited to 15 participants
Register preferably before 26.07.2024

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Preliminary Programme

September 24 (on-line)
Session 1 – 4h

* *Preliminary checks of computer setup*
* **Introduction to Course**
  a) Objectives and Overview
  b) History of MODLFOW
* **Elements of Flow Modeling**
  a) Review of quantitative hydrogeology
  b) Governing equation and finite difference
  c) Input parameters
  d) Boundary conditions
  e) Grid design
  f) Steady-state and transient conditions

September 26 (on-line)
Session 2 – 4h

* **Basic flow modeling with MODFLOW**: specific input packages and solvers
* **Analysis of output**: head/drawdown fields, particle-tracking, water-budget analysis, sources to wells
* **Overview of calibration**
* **Example USGS MODFLOW model**

October 1 (blended)
9 am - 1 pm / 2:30 pm - 6:30 pm CET

* **Lab 1**
  - Introduction to Groundwater Vistas
  - Basic MODFLOW model construction – grid design, boundary conditions, and aquifer properties
* **Lab 2**
  - Basic MODFLOW model construction – from 2D to 3D and steady state to transient
  - Class demonstrations of finite difference solution and MODFLOW pumping test model

October 2 (blended)
9 am - 1 pm / 2:30 pm - 6:30 pm CET

* **Lab 3**
  - Robust NWT solver for MODFLOW
* **Lab 4**
  - Particle Tracking with MODPATH
* **Lab 5 and Lab 6**
  - Groundwater/Surface Water Interactions with MODFLOW using Advanced Packages (STR, LAK, SFR2)

October 3 (blended)
9 am - 1 pm / 2:30 pm - 6:30 pm CET

* **Lab 7**
  - Simulation of Multi-Node wells with MNW package of MODFLOW
* *Lab 8*
  - Analysis of water budgets and simulating sources of water to wells
* **Lab 9**
  - Manual approaches to Sensitivity Analysis and Calibration // Discussion of PEST
* **Lab 10**
  - Modelling Guides (USGS, Haitjema) // Common Modelling Errors
  - Overview of Advanced MODFLOW Packages // Advanced MODFLOW Versions // Transport

October 4 (blended)
9 am - 1 pm

* **Modelling projects**
  - Analysis of Pumping test with MODFLOW model *(to be continued independently)*
  - Dewatering problem: flow model construction, manual calibration, application, budget, and source analysis *(to be continued independently)*

November 8 (online)
Closing session and discussion

"Intensive" courses can be a bit overwhelming, especially for those diving into numerical modeling for the first time. We propose a follow-up: on the final day of the course, an independent exercise is assigned, challenging participants to apply the acquired concepts and techniques autonomously.

This post-course activity allows participants to revisit recorded sessions and seek assistance from us, thereby facilitating a self-assessment process. It is an effective way to see where you stand and figure out which parts are giving you a bit of trouble.

The final session of the course is strategically scheduled approximately one month later, to give a better opportunity to assimilate the course material previously presented.

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Trainers

Daniel Feinstein has worked in the field of quantitative hydrogeology for over 30 years. He studied ground-water modeling at the New Mexico Institute of Mining and Technology and at the University of Wisconsin-Madison before working as a consultant on remediation projects for Papadopulos & Associates and Geraghty & Miller. In 1997 he joined the USGS where he specializes in interpretive studies involving regional ground-water modeling, simulation of groundwater/surface-water interactions, and simulation of transport of natural contaminants. His current research interests include statistical models which emulate process-driven simulations of groundwater age or stream depletion by wells, and transport models which forecast heat flow under climate change. Mr. Feinstein is an adjunct professor at the Geosciences Department of the University of Wisconsin-Milwaukee and teaches modeling courses in Italy.

Francesca Lotti, Ph.D, is a consultant hydrogeologist and Vice-President of Kataclima srl Società Benefit. In 2021 she started SYMPLE, an Innovative Start-Up, together with 4 other partners. She has 20 years of experience in field investigations and numerical modeling with MODFLOW and FEFLOW of contaminated sites, mines, geothermal plants, coastal aquifers, dewatering projects and more. She collaborates with national and international research institutions and companies. From 2001 to 2014 she carried out research at the University of Tuscia; since 2008 she is professor at the University of Camerino, where she has followed numerous MSc and PhD theses.

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School of hYdrogeological modelling & Project-related strategies

We live in a wonderful place, surrounded by wild woods and nearby the Volcanic Lake Vico…

For accommodation suggestions and "how to get there" advises, just ask us!

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