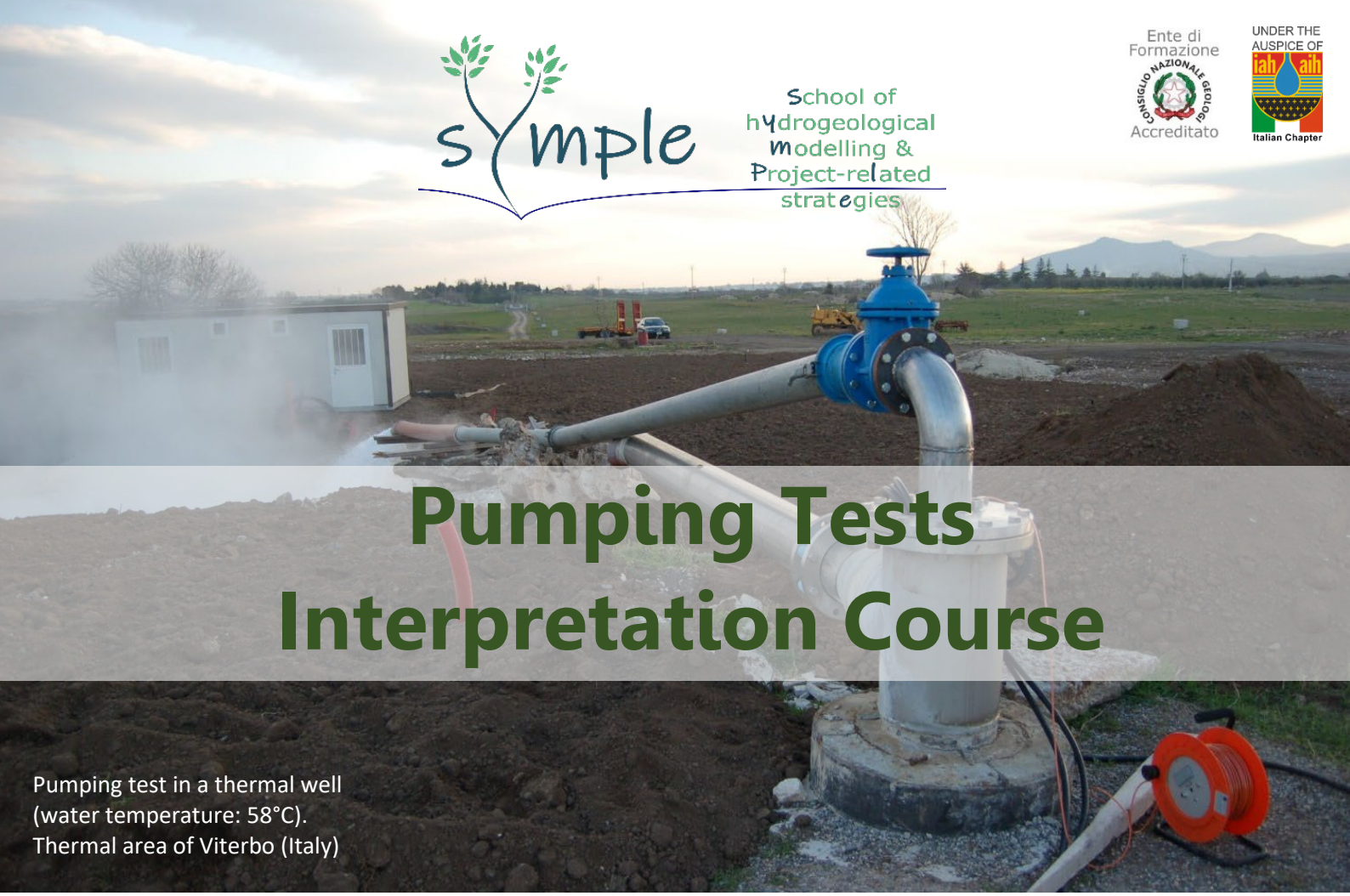
School of hydrogeological modelling & Project-related strategies

Ente di Formazione Accreditato

UNDER THE AUSPICE OF iah aih Italian Chapter

Pumping Tests Interpretation Course



Pumping test in a thermal well (water temperature: 58°C). Thermal area of Viterbo (Italy)

Course outline

The objective of this online course is to review the basic concepts of well hydraulics and present traditional and emerging methodologies for their interpretation, with special emphasis on practical applications.

Specifically, in addition to the traditional fundamental concepts, we review diagnostic graphs, recent developments on the calculation of smooth log-derivatives and Agarwal and Trabucchi's methods for the analysis of recovery tests. These developments suggest an alternative methodology to improve the performance and interpretation of hydraulic tests (GHS_BCN method), which emphasizes the importance of recovery data and careful measurement of pumping rate.

The course will include a brief overview of well construction technologies, assistance with hands-on exercises and assignment with related discussion.

Register here

What is included

- Access to live lessons;
- Software instructions provided before the course;
- Material to carry out the exercises;
- **Unlimited access** to our e-learning platform to watch again the recorded lessons;
- *APC credits* for Italian Geologists.

Costs

- Regular: **350€**
- Students: **Free** for BSc, MSc and PhD students upon presenting documentation.
- Included in the **SYMPLE School** registration (all editions).

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

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Trainers

Francisco Xavier Sanchez Vila

Prof. Xavier Sanchez-Vila earned his PhD in Civil Engineering in 1995 and has since become a leading expert in groundwater flow and contaminant transport. His research focuses on applying advanced mathematical tools to groundwater problems, with groundbreaking contributions in pumping test interpretation for heterogeneous media, reactive transport modeling, and variable-density flows. His work has been widely recognized through awards (including the 2020 Darcy Medal, awarded by EGU, and the 2011 Arthur Ippen Award, from IAHR), research grants, and collaborations with prestigious international institutions.

Beyond research, Prof. Sanchez-Vila has made significant contributions to academia, teaching courses at UPC and as a guest lecturer in Europe and South America. His leadership roles include serving as Director of the Department of Civil and Environmental Engineering and Geosciences at UPC, President of the Spanish Chapter of the International Association of Hydrogeologists, and Vice-Chair of the IAHR Groundwater Hydraulics and Management Committee. Additionally, he has actively engaged in professional and governmental debates on groundwater management in Spain and served on editorial boards of prestigious hydrogeology journals.

Jesùs Carrera

Jesús Carrera graduated as civil engineering at the Polytechnic University of Madrid (1979); he earned his PhD in Hydrology from the University of Arizona (1984). After working as a hydrogeologist, he joined the Polytechnic University of Catalonia (UPC), where he became a professor and founded the Groundwater Hydrology Group (GHS). He later moved to CSIC, where he is a Research Professor at the Institute of Environmental Diagnosis and Water Studies.

His research focuses on groundwater modeling, particularly inverse problems, reactive transport, and poroelasticity. His team has developed influential modeling tools applied to water resource management, pollution, nuclear waste disposal, CO_2 storage, and geothermal energy. His work has also addressed fundamental hydrogeological issues such as heterogeneity, transport equations, and post-injection seismicity. His experience has been significantly gained from working with third world aid organizations on projects in Ethiopia, Burkina Fasso, Peru, and Cambodia and has served on various advisory councils. Recognized internationally, he is a member of the US National Academy of Engineering and Academia Europaea and has received prestigious awards, including the PSIPW and EGU Darcy Medal.

Francesca Lotti

Francesca Lotti, PhD, is hydrogeologist, modeler, trainer and partner of Kataclima. In 2021 she started SYMPLE, an Innovative Start-Up. 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 followed numerous MSc and PhD theses. She regularly holds professional courses, corporate tutoring and lectures at II level Masters. She firmly believes that sharing experience, knowledge and operative tools can make the difference in how groundwater is currently (mis)managed.

Programme

		Contents	Time CEST (UTC+2.00)
Session 1 June 25	Overview of Well construction methods	Types of wells and their applications. Drilling technologies and equipment. Well casing and sealing techniques. Well development. *Resources to know more about well construction methods will be provided.*	2.30-6.30pm
Session 2 June 27	Basics	Introduction to pumping tests, review of transmissivity (T) and storage coefficient (S). Theis and Jacob methods. Effect of boundaries and aquitards. *Exercise: Interpretation of tests from real and synthetic cases using Excel spreadsheets.*	10am-1pm
	Hands-on exercise	Assistance and trouble-shooting in executing the exercises.	2.30-4pm
Session 3 July 4	Advanced methods	Well storage, delayed drainage, fractal models. Variable flow rate, recovery analysis, pulse tests, and slug tests. *Exercise: Interpretation of pumping tests from real-world cases.*	10am-1pm
Session 4 July 11	Emerging methods	Pumping under complex conditions, trend filtering. Diagnostic plots, smooth log-derivative calculation, the GHS_BCN method. *Exercise: application of diagnostic plots and trend filtering.*	10am-1pm
	Hands-on exercise	Assistance and trouble-shooting in executing the exercises.	2.30-4pm
Session 5 July 16	Future methods	Heterogeneity, effective transmissivity, connectivity. Interpretation with multiple observation points, numerical models, and geostatistics. *Exercise: Interpretation of tests using numerical models.*	10am-1pm
Session 6 July 18	Practicalities	Test design and protocols. Practical aspects of conducting a pumping test. *Exercise: design and execution of a pumping and recovery test.* *Assignment: a real-world problem and pumping test data will be provided; the task will be to estimate the aquifer parameters and elaborate a solution to the problem.*	10am-1pm
Session 7 *Day to be agreed with the attendees*	Final discussion	The final session focuses on addressing doubts and discussing homework results. Additionally, participants will have the opportunity to present their own datasets and receive guidance from the instructors.	10am-1pm