

4th and 6th SSC IMPROVE: GEOCHEMICAL AND GEOPHYSICAL METHODS FOR VOLCANO MONITORING AND GEOTHERMAL EXPLORATION

Pontedera (PI), Italy
September 30 – October 3, 2024

ORGANIZING COMMITTEE: Dr. Giulio Bini (Course Director), INGV Bologna; Dr. Leonardo Coppo, West Systems srl.; Dr. Giancarlo Tamburello, INGV Bologna; Dr. Antonio Costa, INGV Bologna.

This course will train PhD and post-PhD students on the basic concepts of geochemical and geophysical volcano monitoring and geothermal exploration. Physico-chemical data highlight the subsurface processes driving magmatic-hydrothermal circulation and the surface fluid emissions. Monitoring these parameters reveals new phases of magmatic activity or changes in geothermal field productivity. Data analysis and statistics constrain the degassing processes, the volatile budgets, and the thermal flows in the subsurface. The participants will acquire theoretical knowledge about the above methodologies, apply them in a measurement campaign at the Larderello geothermal area, and elaborate the collected data using statistical tools available through dedicated web servers.

PRELIMINARY PROGRAM

Monday 30 September 2024

- 9:00–11:00 *G. Chiodini*: Geochemical methods for volcano monitoring and geothermal exploration.
- 11:00–11:30 *Coffee break*
- 11:30–12:30 *G. Tamburello*: Multi-sensor gas analyzer and thermal imaging.
- 12:30–14:00 *Lunch break at the Amalia lake*
- 14:00–15:00 *L. Coppo*: The West Systems srl and its flux-meters.
- 15:00–16:00 *L. Coppo*: Practical demonstration of CO₂ emission measurements with flux-meters.

Tuesday 1 October 2024

- 9:00–11:00 *G. Bini*: Concepts and methods for the analysis of spatial data.
- 11:00–11:30 *Coffee break*
- 11:30–12:30 *G. Tamburello*: Practical demonstration of thermal imaging from ground and drone measurements.
- 12:30–14:00 *Lunch break at Pizzeria / Friggitoria Da Belindo*
- 14:00–15:00 *M. Lelli and G. Bini*: Introduction to the Larderello geothermal area and field work activities.
- 15:00–16:00 *L. Coppo*: Practical demonstration of flux-meter calibration before field work activities.

Wednesday 2 October 2024

- 9:00–10:30 Transfer to Le Biancane (Larderello).
- 10:30–13:00 Field work: practical demonstration of fumarole sampling and thermal imaging. Measurements of soil CO₂ emissions with the accumulation chamber.
- 13:00–14:30 *Lunch break at Enoteca degli Eretici*.
- 14:30–16:00 Field work: measurements of soil CO₂ emission with the accumulation chamber.
- 16:00–17:30 Visit at the museum of Le Biancane and brewery (Vapori di Birra).
- 17:30–19:00 Transfer to Pontedera

Thursday 3 October 2024

- 9:00–13:00 Statistical analysis of the data collected during the field work using the sGs webApp.

Costs: There are no costs for the participating students, who are required to arrange themselves their travel and hotel reservations. Coffee breaks, as well as transportation for the Larderello field trip, are offered by the organization.

Preliminary list of teachers:

- Dr. Giovanni Chiodini
- Dr. Leonardo Coppo
- Dr. Giancarlo Tamburello
- Dr. Giulio Bini
- Dr. Matteo Lelli

Venue: West Systems S.r.l., Via Don Mazzolari 25, 56025 Pontedera (PI), Italy.

Possible hotels in Pontedera (there will be a daily shuttle service connecting the hotels and the meeting venue): <https://www.hotelfalchetto.it/>
<http://www.lesodole.it/>
<https://www.albergolapacepontedera.it/>

To register, send an email to giulio.bini@ingv.it

Deadline for registration: 1 September, 2024.

Due to organizational constraints there may be a maximum number of participants allowed besides the IMPROVE participants, on a first come - first serve basis.

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