Scientific Program of the Workshop

Day 1 (May 11, 2026)

Session 1. Volcano-Tectonic Systems

(Convenor Roland Bürgmann and Raffaele Azzaro)

This session invites presentations on studies of natural laboratories in volcanic areas, such as the complex caldera dynamics of Campi Flegrei and Long Valley and the active magmatism, deformation and seismicity of Mount Etna and Kilauea. By integrating diverse geophysical investigations—from micro-seismicity and high-resolution seismic imaging to multi-sensor geodetic monitoring and physics-based modeling—the session aims to provide a comprehensive view of subsurface processes. We encourage an interdisciplinary approach that crosses between laboratory simulations and natural observations, specifically targeting the interplay between magma transport, active faulting, and surface deformation. We seek to better characterize the evolving states of volcanic unrest and the fundamental mechanisms governing magma-fault interactions across different volcano-tectonic systems.

Session 2. 3-D distribution of deformation: strain localization and faulting across deforming regions

(Convenors Taka'aki Taira and Pierfrancesco Burrato)

This session explores the multi-scale, 3-D distribution of crustal deformation, focusing on the mechanisms governing strain localization and faulting in complex tectonic settings. By bridging the gap between deep-seated geodynamic processes and surface expressions of faulting, we invite contributions that utilize diverse methodologies—from space geodesy and seismology to structural geology through field observations and laboratory experiments, paleoseismology and numerical modeling of paleogeodetic markers.

The discussion will emphasize comparative studies, but will not be limited to, between two of the world's best-instrumented natural laboratories: the Central Apennines in Italy and the San Andreas fault system in California. These regions provide unique opportunities to investigate how crustal heterogeneity, fluid migration, and structural inheritance influence the transition from distributed strain to localized failure. In the framework of the INGV-BSL Memorandum of Understanding, we encourage submissions that integrate multidisciplinary data to improve our 3-D understanding of active tectonics, earthquake physics, and the evolution of fault systems across deforming plate boundaries as well as different space-time scales.

Day 2 (May 12, 2026)

Session 3. Precursors to failure and transient phenomena during the seismic cycle

(Convenors Chris Marone and Elena Spagnuolo).

We invite presentations on a broad range of topics related to the transient phenomena and precursory events preceding failure. Such phenomena, for example changes in b-value or the occurrence of slow slip prior to failure, have been known for 50+ years but remain poorly understood. We encourage input

from lab results related to precursory changes in elastic wave speed and from other areas including field studies and theory. One goal would be to foster better connections with rapidly expanding interest in the use of AI to identify and interpret precursory changes prior to earthquake-like failure and post-seismic changes related to frictional healing and crack closure.

Session 4. Observational and numerical constraints to dynamic rupture propagation

(Convenors Weiqiang Zhu and Massimo Cocco).

This session is dedicated to discussing recent advances in modeling and interpreting dynamic rupture propagation during earthquakes, while also addressing open questions and conflicting evidence arising from both the complexity of seismogenic processes and the paucity of experimental data. Particular interest is given to nucleation and the initial stages of dynamic propagation. Contributions from observations during natural and laboratory earthquakes are welcome. Interest extends to the dynamics of microearthquakes and to contributions aimed at discussing the differences between the physical and chemical processes that cause small and large earthquakes. Studies on natural and anthropogenic earthquakes are encouraged.

Day 3 (May 13, 2026, morning)

Session 5. Real-time earthquake characterization and early warning

(Convenors Richard Allen and Aldo Zollo)

Implementation of earthquake early warning systems around the globe is motivating the deployment of denser geophysical observation systems and the exploration of new sensor networks including low-cost sensors, smartphones, fiber optic cables, strainmeters and geodetic instrumentation. In this session we will review new approaches to rapid earthquake detection, and other hazard reduction strategies that leverage these new sensor networks.

Day 3 & Day 4 (May 13, afternoon, and May 14, 2026)

Field Trip (TENTATIVE ITINERARY):

The excursion is scheduled to depart from Sala Baldini at approximately 5:00 p.m. on May 13, proceeding to Santo Stefano di Sessanio (AQ) for the overnight stay. On May 14, we will depart the accommodations early in the morning to tour the surrounding area, visiting locations such as San Pio delle Camere, Paganica, Camarda, and Assergi, before returning to Sala Baldini and/or the INGV headquarters at around 8:00 p.m.

General information about the field trip:

- All associated costs will be covered by INGV using funds allocated through the existing MoU between INGV and BSL.
- Participation is limited to a maximum of 50 attendees.

- Due to the nature of the funding source, accommodation for the two-day trip will be prioritized for personnel from INGV and BSL, session conveners, and national and international guests. Following the accommodation of the aforementioned individuals, registrations of colleagues from other institutions will be considered.
- Appropriate clothing and footwear are mandatory.