Activity 3.6 - Training current RIs staff and user communities

WP: WP7 - Geosphere/Landsurface

Title: **Geophysical instruments and data processing**

Short description of the course: The course is held at the pilot sites of the WP7 in the Basilicata region. Introduction to the near-surface geophysics; Description of the instrumentation; elements of data processing; field activities; demonstration of data analysis.

Training objectives: Learn the main survey and monitoring cutting-edge techniques for near-surface applications and natural risks.

Location: CNR – IMAA;

Address: C.da Santa Loja, Tito Scalo, 85050 Potenza;

Period: 09-12 giugno 2025

Duration (days): 4

Course delivery method (online course/in-person/mixed): in person

Number of speakers: 6

Name of the speakers: Maurizio Porcu (Codevintec), Stefano Del Ghianda (Geostudi Astier srl), Gianfranco Morelli (Geostudi Astier srl), Luigi Vignola, Frantisek Stanek (Silixa), Plamen Atanassov (Silixa).

Training modules: 4

Syllabus:

(1) Focus on high-resolution, 3-dimensional, subsurface mapping thanks to the use of step-frequency radar technology. Theoretical grounds, acquisition techniques, and data pre-processing, processing and post-processing with specific reference to GPR Technology developed by Kontur.

(2) The state-of-the-art of 3D ERT 3D, the new Syscal Terra, and the Multi-Tx and Multi-Syscal approach. Data management using ERTLab Studio software.

(3) Execution of seismic surveys using ESAC seismic antenna, acquisitions with 2D arrays using passive technique, use of "Lunitek" sensors model "Sentinel GEO MKII," and data processing using open-source software (Geopsy).

(4) Theoretical grounds of fiber optics in DAS, acquisition techniques, and data pre-processing, processing, and post-processing with specific reference to iDAS technologies.

Extra logistical needs: PC and ad-hoc software are required

Short introduction of each speaker:

Maurizio Porcu holds a degree in Telecommunications Engineering from the Politecnico di Milano, where he also worked as a researcher on projects related to the development of ground-penetrating radar systems. He is a member of the technical committee of IATT (Italian Association of Trenchless Technology) and since 2014, he has been working for the company Codevintec, where he is involved in activities related to the marketing and use of terrestrial geophysical instruments and organizes training courses on their use. Maurizio Porcu conducts research activities, particularly in ground penetrating radar, polarization, the effect of stacking, and the use of AI.

Gianfranco Morelli received a degree in electrical engineering from the University of Pisa in 1994. He is Associate and Technical Manager of Geostudi Astier srl, founded in 1999, specialised in: development of systems and software for geophysical prospection, with a focus on 3D mapping methods for Resistivity, Electromagnetic, Ground Penetrating Radar and Seismic surveying, and long-term down-hole monitoring systems; conceptual development of geophysical instruments for IRIS Instruments – France (Syscal Pro series) and IDS – Italy (Stream EM -Stream X – Stream C and Stream UP multi-channel radars); data processing and consulting for geophysical surveying applied to environmental and forensic studies, civil, geotechnical and mining engineering, archaeology, hydrogeology.

Stefano Del Ghianda is associated with Geostudi Astier srl, an Italian Company that deals with geophysical equipment and software. He has been a sales manager since 1999 (dealing with rental, selling, customer assistance, training courses, and development). He has experience in the field and data processing applied to environmental and forensic studies, civil, geotechnical, and mining engineering, archaeology, structural geology, and hydrogeology.

Luigi Vignola graduated in geological sciences at the University of Basilicata in 2001. He specialized in geophysical prospecting and has been the technical manager of a geognostic survey company since 2003. He has also been the technical director for a company that deals with geophysical prospecting since 2011. He knows various seismic prospecting techniques, both active and passive. He deals daily with field acquisition and data processing activities. He uses and has tested various commonly used software for processing seismic signals, both commercial and open source.

Frantisek Stanek obtained his Ph.D. degree in geophysics from Charles University, Czechia, in 2018. From 2011, he worked at the Czech Academy of Sciences, cooperated with many international research institutes, and consulted for service companies in the energy sector. In 2020-2022, he worked as a postdoctoral fellow in the Department of Geophysics at Colorado School of Mines, Golden, Colorado, USA, where he was a member of the Reservoir Characterization Project and the Center for Wave Phenomena consortia. In 2023, Frantisek joined Silixa, Ltd. as a senior geophysicist and project manager. Frantisek has experience with integrated reservoir characterization, microseismic and induced seismicity monitoring using both surface and downhole arrays, fiber-optic sensing applications, and cloud computing. Frantisek is a co-author of over 15 peer-reviewed papers, more than 20 conference abstracts, and a holder of two patents. He is an active member of the Society of Exploration Geophysics (SEG), the European Association of Geoscientists and Engineers (EAGE), and the Society of Petroleum Engineers (SPE).

Plamen Atanassov is a Field Engineer—E&I plus Mining at Silixa Ltd. He has 13 years of hands-on experience with fibre optic sensing systems and field installations.