



## Report of Transnational Access Projects

**Project ID:** *C1\_TA3-84-1\_3*

**Principal investigator:** *Ioannis Fountoulakis, University of Patras, ORCID : 0000-0003-1636-133X*

**Project title:** *Optimizing Seismic Detection through Advanced Techniques in Irpinia*

**Project acronym:** *OPTIMISED*

**Hosting installation:** *TA3-84-1, Università di Napoli Federico II, Physics Department*

**Hosting team:** *Antonio Scala<sup>1</sup>, Gaetano Festa<sup>1</sup>, Claudio Strumia<sup>1</sup>, Francesco Scotto di Uccio<sup>1</sup>,*

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**Period of access:** *In person: 2025-06-15 to 2025-07-06*

### Report of activities:

*The characterization of low-magnitude seismic events is a crucial task for improving our understanding of seismicity. However, the low signal-to-noise ratio of earthquake signals recorded by conventional seismic networks often hinders phase identification at a sufficient number of stations to accurately constrain earthquake locations. The increasing adoption of fiber-optic technologies in seismology, particularly Distributed Acoustic Sensing (DAS), offers unprecedented decametric spatial resolution for recording seismic signals. Despite this potential, the development of robust and standardized methodological approaches remains challenging.*

*Within the frame of the TA proposed project OPTIMISED, we investigated the use of DAS systems deployed at the Irpinia Near Fault Observatory (INFO) in southern Italy to detect low-magnitude earthquakes and extract phase arrival times using machine-learning techniques. We implemented established single-station phase-picking architectures available in the SeisBench framework (Woollam et al., 2022), testing several models trained on both local and global datasets. Promising results were obtained using the original PhaseNet model (Zhu & Beroza, 2018) as well as models trained on the DiTing dataset (Zhao et al., 2023), supporting the applicability of established phase pickers to earthquake signals recorded by DAS systems.*

*In addition, we explored the development of a back-projection technique to estimate hypocentral coordinates, with the goal of integrating this approach into near-real-time monitoring workflows. Preliminary results demonstrate the feasibility of determining earthquake hypocenters with an accuracy comparable to that achieved using conventional seismic monitoring infrastructures.*



**Project outcomes:**

*DAS data are available at : Doi: <https://doi.org/10.5281/zenodo.19369960>. Data are distributed under CC-BY 4.0 license*

*DAS data will be also distributed by the INGV EIDA node and the EPOS platform under the Irpinia Near Fault data provision after agreement on metadata and formats (expected by the end of April 2026).*

**Note: Data, products, software and publications resulting from TA activities must be publicly accessible under a CC-BY 4.0, GPLv3 or equivalent open license. No embargos beyond June 2026 are allowed. They must cite Geo-INQUIRE as the source of funding. Minimal citation: “Geo-INQUIRE is funded by the European Union (GA 101058518)”.**

