**Geo-INQUIRE installation:** Eastern Sicily - INFN-LNS submarine FO cable [TA3-83-5], Eastern Sicily - Distributed Acoustic Sensing [TA3-83-6]

**Project title:** OMAC project: Optimizing DAS data selection for Microseisms Analysis offshore East Sicily

**Transnational access principal investigator:** Florian Le Pape (Ifremer)

**Project acronym:** OMAC

**Project report ID:** 3rd Call

**Transnational access team:** Stephan Ker (Ifremer), Salvo Viola (INFN-LNS), Giorgio Riccobene (INFN-LNS), Philippe Jousset (GFZ), Gilda Currenti (INGV)

**Date of visit:** 17 - 30 September 2025

**Geo-INQUIRE Virtual Access:**

**Data/Products:** light version of the generated DAS data to be uploaded in miniseed format on the Italian EIDA node

**Project report:**

Microseisms, or seismic noise generated from the interactions of wind driven gravity waves, define a unique connection between the sea and solid Earth, with associated seismic surface waves dominating global ambient seismic noise records. The use of Distributed Acoustic Sensing (DAS) technology applied on fibre optic submarine cables provides a new exciting way for detailed characterisation of the offshore microseism wavefield. However, the use of such technology at its full potential calls for applications where continuous monitoring is key, raising further the questions regarding strategies for handling the generated data.

In this context, the project has been working on two main objectives to test on a submarine cable in the Eastern Sicily region a specific DAS processing workflow for near real time microseism “events” characterisation.

i - DAS workflow for selecting microseisms events : The goal was to set up a DAS processing tree with multiple data output formats, including real-time data streaming of a light version of the recorded data writable in miniseed format. This work and associated tests were performed with support from the optoDAS interrogator manufacturer (ASN) as they already developed tools for this conversion themselves. The generated light version of the DAS data in miniseed format could then be easily read over the network for a first interpretation/selection of specific raw DAS data. Tests and issues encountered during the setup of the stream branch acquisition prevented continuous streaming of the light data to miniseed throughout the whole project duration. However, the continuously written light data to hdf5 format enabled a posteriori quick conversion to miniseed format for generating a continuous dataset ready for future dissemination on the Italian EIDA node.

ii - Microseism characterisation offshore Sicily : The data generated with the project looks promising, highlighting microseism short events (< half a day) consistently on different portions of the cable. The miniseed files were used to quickly identify those events in the frequency range 0.5 to 2Hz. Over the recording period they seem to last around 12h but further investigation will be performed regarding their origin. Based on the tested processing workflow, continuous selection of microseisms

events could potentially be defined over a 48h to 72h raw data buffer period. The idea being to use the data streamed to miniseed format to then select/ request specific time windows within the denser raw DAS data for more detailed processing.

With a continuous/ long term acquisition in mind, the project's outputs highlight directions towards a more efficient handling of the DAS data by "cataloguing" short period microseism events for specific applications (seismic imaging, weather monitoring, …) and avoiding excessive storage.

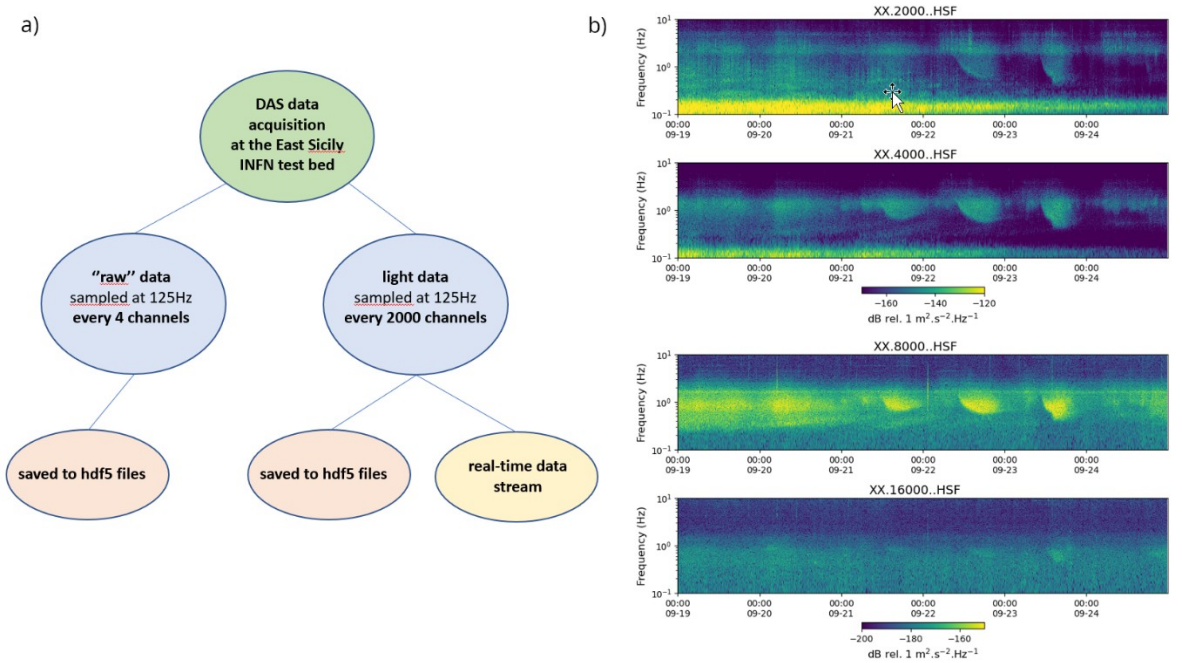


**Figure OMAC: a) Data acquisition strategy** - simultaneous data outputs including continuous DAS data written to disk in different formats and a real-time data stream; **b) Preliminary data analysis and microseisms observations** - spectrograms obtained from miniseed data outputs at different cable positions (stations names defined by DAS channel number).