Geo-INQUIRE Transnational Access Project Report: Alice Affatati (OGS, IT)

Geo-INQUIRE installation: Eastern Sicily - Distributed Acoustic Sensing (TA3-83-6)

Project title: Distributed acoustic sensing for acoustic modelling and evaluation of marine mammal response before, during, and after sparker emissions - DIAPASON

Transnational access principal investigator: Alice Affatati (National Institute of Oceanography and Applied Geophysics - OGS, ITALY)

Project acronym: DIAPASON

Project report ID: C3-TA3-83-6-2 (3rd Call)

Transnational access team: Alice Affatati (PI, OGS), Luca Baradello (OGS), Fabio Meneghini (OGS), Denis Sandron (OGS), Philippe Jousset (GFZ), Sergio Andres Diaz Meza (GFZ)

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Geo-INQUIRE Virtual Access: GFZ VPN

Data/Products:

- DOI: in preparation

Project report:

DIAPASON was developed within the DELUGE project, which investigates the erosional and depositional signatures of the Zanclean megaflood in the central Mediterranean Basin (Figure 1).

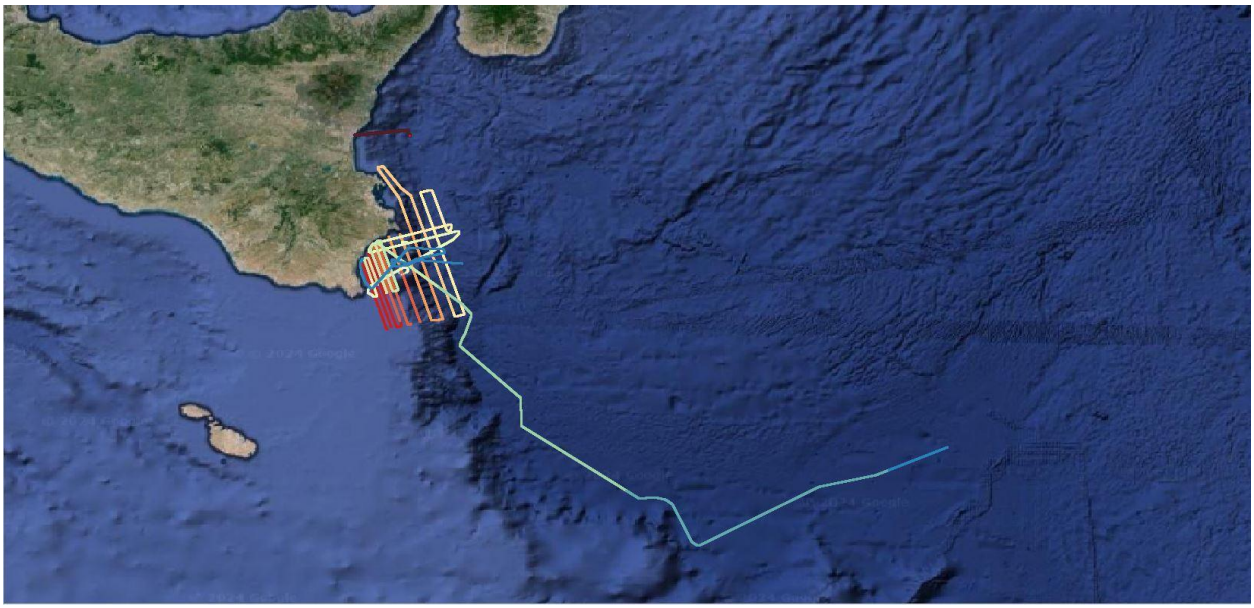

Fig. 1: Map of the survey area in the Ionian sea, showing the fiber optic in red and the ship route in different colors which identify different segments of the survey

During the M199 *Meteor* cruise (25 February–11 March 2024) in the Ionian Sea, high-resolution multichannel seismic data were acquired using a sparker source, with PAM/MMO operators continuously monitoring for marine mammal presence.

The overall aim of DIAPASON is to characterize acoustic propagation from the sparker source and other soundscape features using Distributed Acoustic Sensing (DAS) data. The project seeks to assess whether the seismic survey contributed to the local soundscape, to improve our understanding of acoustic variations during seismic operations, and to support the development of more effective monitoring and mitigation strategies.

During her stay at GFZ, Alice learned to use Fobench, an in-house GFZ Python-based package, and began developing her own analysis codes building on this tool. She also acquired experience in processing and interpreting DAS data.

This study was opportunistic. The survey vessel was located relatively far from the DAS cable, and the closest seismic shots occurred along a parallel track. Preliminary results show indications of the sparker signal within the DAS dataset, but these observations are not yet conclusive. Work is ongoing to have a definitive answer.

Data analysis is still in progress (Figure 2).

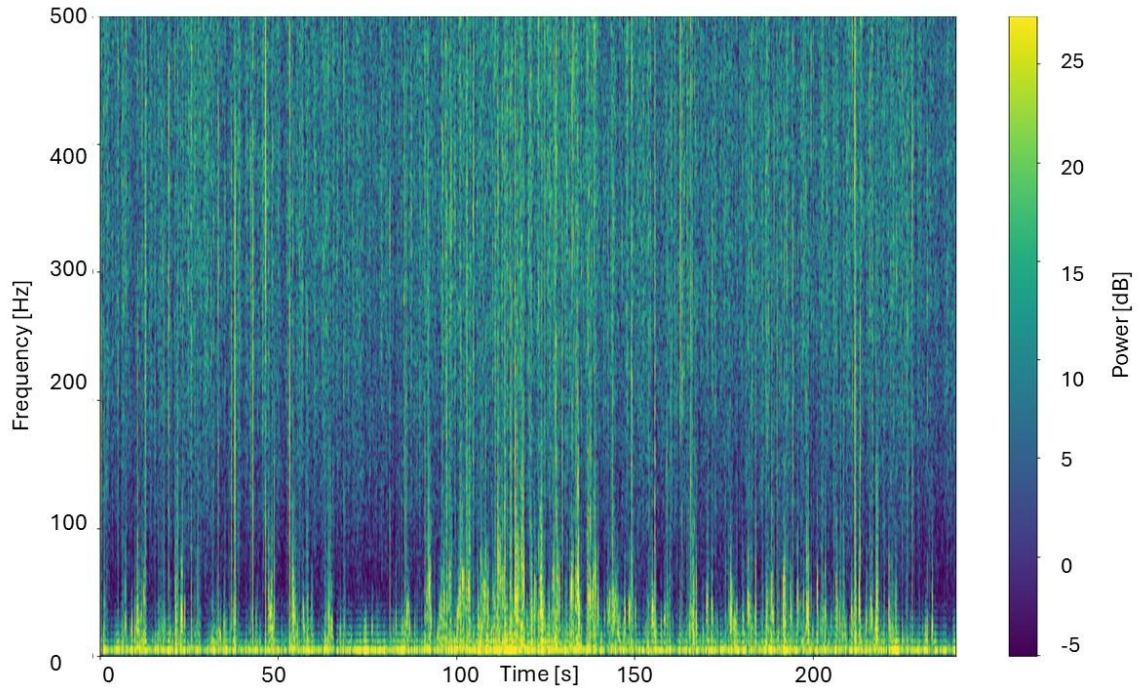

Fig. 2 Sample spectrogram recorded during the survey for channel 650

To reduce noise and improve signal interpretability, several steps have been carried out, including stacking, comparison of pre-survey and during-survey data, and examination of potential temporal changes in the soundscape. These analyses reveal differences between baseline and survey periods, although the specific contribution from the sparker source remains uncertain.

The dataset will be shared publicly upon publication.