Geo-INQUIRE Transnational Access Project Report: Rotational -Night from Gizem Izgi (University of Potsdam, Germany)

Geo-INQUIRE installation: Eastern Sicily – Pool Instruments TA3-83-1

Project title: Investigating Rayleigh Waves Using a Rotational Seismometer at Etna's Southern Flank

Transnational access principal investigator: Gizem Izgi (University of Potsdam, Germany

Project acronym: Rotational - Night

Project report ID: C1_TA3-83-1 (1st Call)

Transnational access team: Dr.Gizem Izgi, Daniel Vollmer (University of Potsdam, Germany)

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Geo-INQUIRE Virtual Access:

Data/Products:

- Data will be available soon via GEOFON

Project report:

Mount Etna, situated on the eastern coast of Sicily, Italy, is among the most active volcanoes in Europe and is characterized by frequent eruptions and related seismic activity (Patanè et al., 2004). Its complex internal structure, heterogeneous volcanic edifice, and dynamic magma plumbing system produce a wide variety of seismic signals, including volcanic tremor, long-period events, and prominent surface waves.

Recent advances in seismic instrumentation, particularly the development of rotational seismometers, have created new possibilities for studying wavefield characteristics that are not fully resolved by conventional translational sensors. This deployment was designed to complement translational recordings from the permanent ESLN station with measurements of rotational ground motion, allowing for a joint investigation of translational velocity, strain, and rotation.

The main goal of this short-term deployment was to test the installation and precise alignment of the BlueSeis-3A rotational seismometer in a volcanic setting, assess data quality under field conditions, and confirm reliable synchronization with the colocated broadband sensor. In addition to these technical objectives, several volcano-tectonic (VT) events were successfully recorded during the deployment. Using the rotational sensor data, preliminary event locations were determined, demonstrating the feasibility of source localization based on rotational measurements in a complex volcanic environment.

The dataset acquired during this trial provides a reference for future longer-term deployments and for subsequent analyses of Rayleigh waves, polarization behavior, and wavefield scattering in the summit region of Mount Etna. The results from the VT event analysis are currently being prepared for publication, and a dedicated manuscript describing the methodology and findings is in preparation.

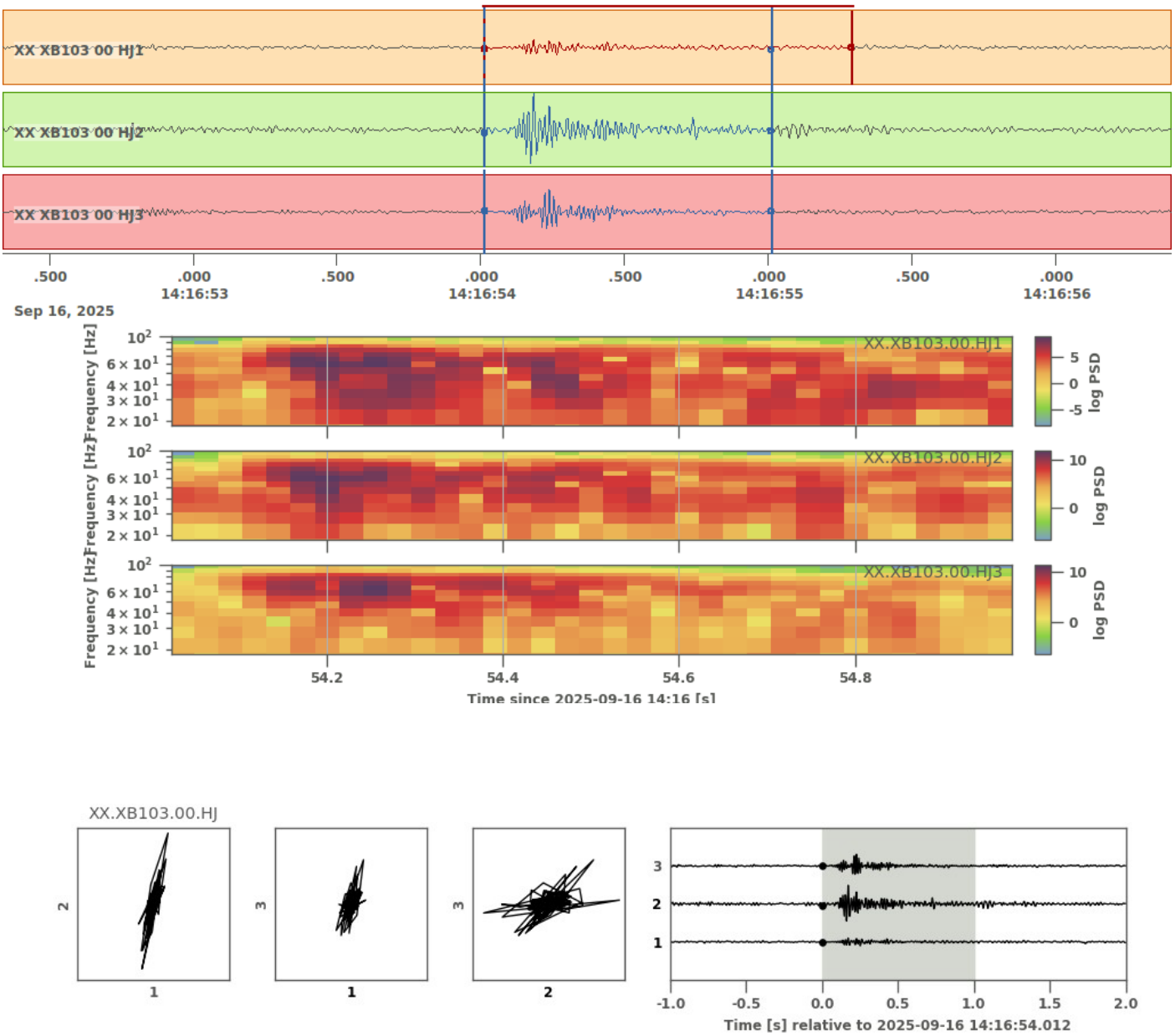

Figure: An event recording from the rotational sensor. a) 3 component rotational rate seismograms b) Spectrograms c) Hodograms showing polarization directions of three components.