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Rotational sensor on a volcano: New insights from Etna, Italy

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Rotational seismology is an emerging field of seismology with rotational sensors such as blueSeis-3A as portable devices. We deployed one of these rotational sensors on Etna volcano from August to September 2019 in the middle of a 26 stations broadband seismic array and a fibre-optic cable deployed for Distributed Acoustic Sensing (DAS). We, therefore, recorded continuously the full seismic wavefield using a 6C station (rotational sensor co-located with a broadband seismometer) for 30 days.

We will present an overview of our work on the rotational data in combination with a broadband seismometer. We will (i) compare the translational with rotational data and show how they complement each other, (ii) calculate back azimuths using only a 6C station or using merely the horizontal components of the rotational sensor, (iii) determine Love and Rayleigh wave velocities from the rotation rate and (iv) perform a simple inversion for the shallow velocity structure below the station, and finally (v) discuss the usefulness of such a sensor in a volcanic environment and (vi) highlight what new it would bring to volcano-related research.