Spatial and Temporal Patterns in Microseismicity in the Eastern Alps

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The Alps have been subject to research in different disciplines over many decades. Nevertheless, fundamental questions regarding their formation history and current tectonic configuration remain unanswered today. The AlpArray programme "Mountain Building Processes in 4D" is an interdisciplinary approach to explore physical processes involved in the evolution of the Alps. A key objective is to understand the coupling of deep mantle structure and processes to surface geology and kinematics. The observation of microseismic earthquakes is an important step, because they are an expression of the interplay between stress and strain. Seismic activity can be correlated to geology to reveal where the active deformation takes place. Also, a comprehensive catalogue will provide a basis for moment tensor inversion studies that will help to clarify tectonic regimes, as well as local seismic tomography to illuminate the underlying structures.

In this work, we present a high-resolution catalogue of microseismicity in the south-eastern Alps. We use data from the temporary AlpArray Swath-D network, consisting of approximately 150 broadband seismic stations in the south-eastern Alps. The network was deployed in late 2017 for a period of two years, and has a station spacing of approximately 15 km. By a combination of different waveform-based methods for detection and localization, we reveal and analyse the main spatial and temporal patterns in the local microseismicity for the first year of Swath-D data.