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Detecting Microseismicity in the Eastern Alps using the Swath-D Network

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Despite the amount of geophysical and geological information available for the Alps, its large scale structure and formation history is still poorly understood. Seismic tomography profiles in the Eastern and Southern Alps seem to indicate opposing subduction polarization, with an apparent Moho gap separating the slabs. Swath-D is a subnetwork of the AlpArray initiative, with the main purpose of increasing the resolution at the transition between the Eastern and Southern Alps. It consists of approximately 150 broadband seismic stations that were deployed in late 2017. The region is not known to be seismically very active, judging from global earthquake catalogs. With an inter-station spacing of less than 15 km, however, the detection threshold will be decreased dramatically, and we expect that this will reveal high seismic activity on the lower bound of the magnitude spectrum.
In this study, different waveform-based detection and localization algorithms have been tested to optimize the resolving power and precision of the seismic network. As a preliminary result, we present a catalog of the local microseismicity. A first-order analysis of spatial and temporal patterns in this microseismicity provides insight into the stress state and fault structures in the region. Because the region is thought to play a key role in the Alpine orogen, understanding its active deformation processes will contribute greatly to our understanding of the Alpine orogen and its formation.