



The AlpArray SWATH-D experiment - A dense seismic array in the Central, Eastern and Southern Alps

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The collaborative SWATH-D seismological experiment involves the deployment of 150 broadband stations within a dense array between western Austria and northeast Italy between August and November 2017. The array will operate for two years until the end of summer, 2019. The deployment complements the network of seismic stations of the international AlpArray project. Currently, 70 out of 150 stations provide real-time data and are available online for earthquake monitoring purposes. Depending on the specific site conditions, stations run on mains power (with backup batteries), or autonomously on high-capacity air batteries or with solar power. The sampling rate is 100 Hz and timing is provided through GPS synchronisation. The high station density (15 km spacing) implies that some stations might have higher noise levels (e.g., near roads or urban areas) than those located at more quiet locations in the Alps (e.g., near mountain retreats). The first service trip is planned for April 2018 when all stations will be visited and data will be collected from off-line stations. Meanwhile, quality control is performed on a daily basis and incoming data can be used to improve location accuracy of weak earthquakes in the catalogue for online stations of the local agencies. SWATH-D will provide high-resolution images from the surface into the upper mantle in order to test the hypothesis that a switch in subduction polarity juxtaposes the northward dipping Adriatic plate in the east with the southward dipping European plate in the west (Lippitsch et al. 2013). Within the areas covered, previous studies have proposed that the Moho is offset (TRANSALP Working Group, 2002) and locally even disappears (Spada et al. 2013). The data created in this project will be used directly or indirectly by 20 individual projects of the 4D-MB Priority Program (Mountain Building Processes in Four Dimensions, 2017) of the German Research Foundation (DFG). In enhancing the resolution of crustal and mantle structures, potentially down to the mantle transition zone, this experiment will allow testing of the hypothesis that re-organizations of the mantle since late Oligocene time have had both immediate and long-lasting effects on earthquake distribution, crustal motion and landscape evolution in the Eastern and Southern Alps. The evolution of this highly 3-D structure through time, the 4th dimension, will be achieved by integrating geophysical images of the crust-mantle system from Swath D with geologic observations and thermomechanical modelling.