

Title: SWATH D: Providing seismicological data for the SPP 4D-MB -A dense seismicological station network in the Central and Eastern Alps

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The SWATH-D experiment focuses on the provision of seismic data from a dense seismic network in the Central and Eastern Alps. This dense deployment of 153 stations is a complement of the larger-scale AlpArray “backbone” network. This array was extended to the east by a cooperation with the LMU group with 10 online stations making a total number 163 stations. SWATH-D will provide high-resolution images from the surface into the upper mantle as it focuses on a key area of the Alps where e.g. the hypothesized flip in polarity is suggested to occur, and where the TRANSALP experiment has imaged a jump in the Moho (TRANSALP Working Group, 2002). The data obtained in this project is used directly by 20 individual proposals of the MB-4D Priority Program (Mountain Building Processes in Four Dimensions, 2017) of the German Research Foundation (DFG, Deutsche Forschungsgemeinschaft). The data products here obtained are also contributing to 13 proposals and is thus an important link within the MB-4D Priority Program and the international AlpArray communities and a scientific service to many of the proposals within the DFG Priority Program community. The experiment has specific Memorandum of Understanding between the GFZ and institutions in Italy: Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), the Civil Protection Trento, the Civil Protection Südtirol. Also a MOU has been signed with ZAMG (Austria). The stations are currently operating and will be collected in September 2019. The location of SWATH-D stations according to several key questions of 4DMB is shown in Figure 1 was only possible in collaboration with local authorities and a large number of colleagues from different institutions (Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Uff. Studi Sismici e Geotecnici Trento, Amt für Geologie und Baustoffprüfung Südtirol and Civil Protection Südtirol.

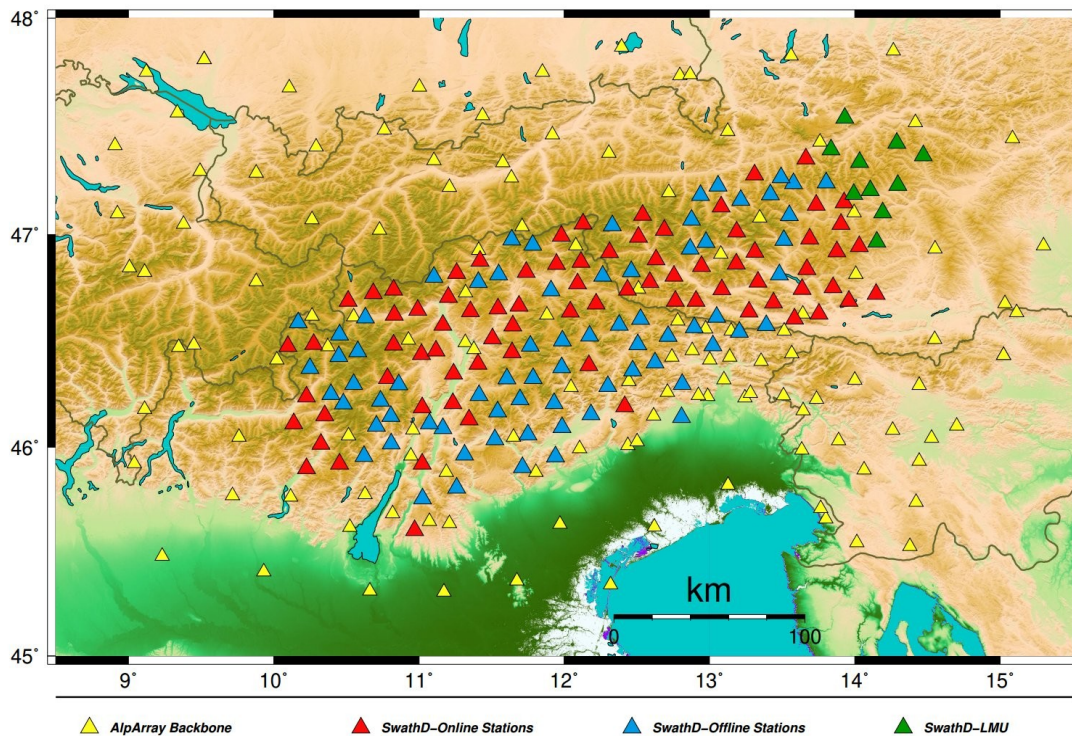


Figure 1: The distribution of stations of the Swath-D network. Red triangles are online stations. Blue triangles are offline stations. The station spacing is 12-15 km. Green triangles are the extended stations from LMU. The smaller yellow triangles from the AlpArray backbone deployment are plotted here as reference.

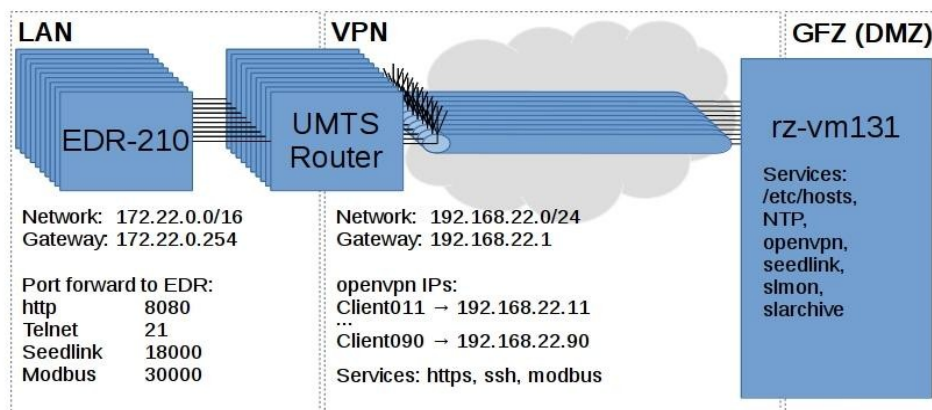


Figure 2: At each online station a LAN between the data logger and the router is established. The mobile router is the default gateway. An OPENVPN tunnel provides access from the server to the station and sum up to a VPN Network with all routers and servers.

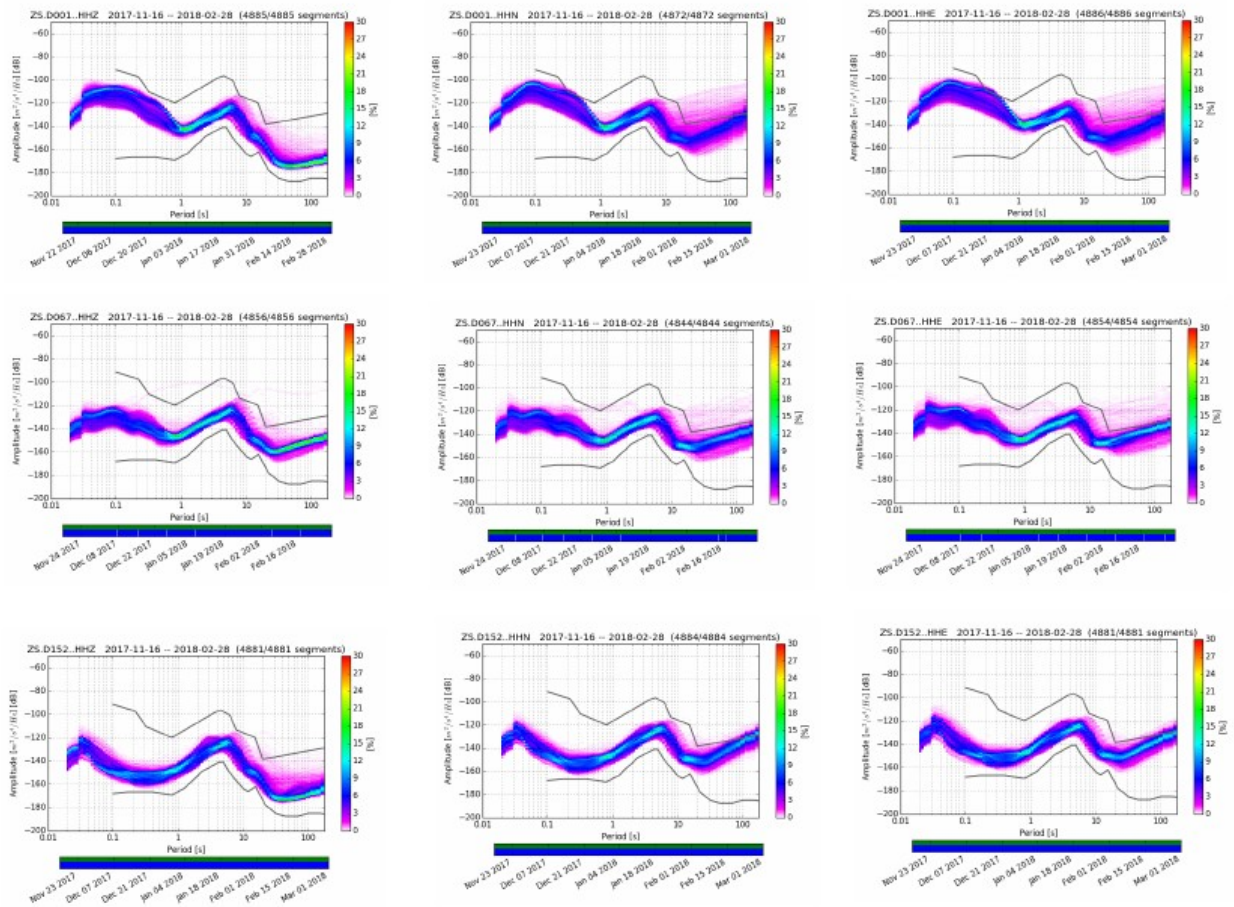


Figure 3: Some examples of data quality analysis shown as noise PDFs (probability density function) from stations D001, D067 and D152. The PDF measures the relative density of PSD (Power Spectral Density) values with a color scale (from SEISCOMP3 software)

Publication list -

Heit, Benjamin; Weber, Michael; Tilmann, Frederik; Haberland, Christian; Jia, Yan; Pesaresi, Damiano (2017): The Swath-D Seismic Network in Italy and Austria. GFZ Data Services. Other/Seismic Network. doi:10.14470/MF7562601148.

Heit, B.; Weber, M.; Haberland, C.; Tilmann, F.; Hemmleb, S.; Schwarz, S.; Handy, M.; Jia, Y.; Pesaresi, D. (2018). The AlpArray SWATH-D experiment. Geophysical Research Abstracts Vol. 20, EGU2018-11509, 2018 EGU General Assembly.

The AlpArray Swath-D Experiment: Instalations in NE Italy, Pesaresi, D., B. Heit, G. Durì, C. Haberland, F. Tilmann, S. Parolai, M. Weber, GNGTS Congress II 37° convegno nazionale del GNGTS, 19 al 21 novembre 2018, Bologna, Italy