ESC2016-538-1, 2016
35th General Assembly of the European Seismological Commission
© Author(s) 2016. CC Attribution 3.0 License.

35th General Assembly of the European Seismological Commission
4–10 September 2016
Trieste

Two new Broadband Stations of the Austrian Seismic Network (OE/ZAMG)

Helmut Hausmann, Stefan Weginger, Nikolaus Horn, Anton Vogelmann, Rudolf Steiner, Yan Jia, and Wolfgang Lenhardt

Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Departement of Geophysics, Seismology, Vienna, Austria (helmut.hausmann@zamg.ac.at)

The first seismic analogue station was installed in Austria in 1903. Since then, the seismic network was continuously upgraded to enhance the sensitivity and range of the network. From 1989 stations were build allowing the remote transmission of data. By 2016 ZAMG is operating the Austrian Seismic Network with 18 broadband and 22 strong-motion station and provides a 24/7 monitoring and analytical service to inform the Austrian national and provincial Civil Protection authorities, the public and media about the expected impact of current earthquakes. Through international exchange the data of more than one hundred seismic stations are processed in real-time to provide automatic alerts. In the context of monitoring, local networks are operated at the Feistritzbach- and Kölnbreinbarrage, at a mining in Schwaz as well as a strong-motion network in Vienna. In the frame of Austria's commitment within the CTBTO a National Data Center is maintained in order to detect nuclear explosions.

In this work we present the noise analysis from site selection, our concept of installation and the preliminary performance of the two new permanent broadband stations RONA (Rosalia, 47.7°N 16.3°E) and BIOA (Bad Ischl, 47.7°N 13.6°E). The network density in the eastern and central part of Austria has improved from 115 to 95 km (mean inter-station distance). In the western part we have an average network density of 65 km.
The site selection surveys include noise analysis to investigate the impact of anthropogenic sources (day and night variations) and the wind. For example, vibration mitigation at a site showed clearly background ambient noise controlled by the nearby windfarms.
The new stations were installed in a 4 m deep vault and in a gallery system and were equipped with co-located Streckeisen STS 2.5 and EpiSensor instruments in combination with Kinemetrics Q330 recorders. The standard installation includes protection against dripping water and wind, shielding for magnetic field, moisture repellent isolation, lightning protection, isolating transformer, thermal insulation and shielding and a UPS.
The preliminary performance considering noise conditions was assessed by probabilistic power spectral density analysis and a comparison of noise spectra for time intervals during day and night. To estimate the site response the spectral ratio method (H/V) was applied to both noise and shear wave spectra. The origin of unknown signals was identified by using polarization analysis and locations from a small temporary network.