

Two strong earthquakes near Ebreichsdorf

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Two strong earthquakes with a magnitude of 4.2 followed by 25 aftershocks occurred near Ebreichsdorf in 2013. A summary is given about seismograms, spectral analysis, focal mechanism and historic seismicity around Ebreichsdorf.

The southern Vienna Basin was shaken at 4:06 CEST on Sep. 20th and at 19:17 CEST on Oct. 2nd by two earthquakes both with a magnitude of 4.2 and depths around 12 km. The epicenters were located in the southeast of Ebreichsdorf (47.92° N, 16.41° E and 47.93° N, 16.40° E). The earthquakes were well registered on all broadband stations operated by the Austrian Seismological Service and also recorded on the nearby strong-motion stations in Wiener Schwadorf and in Vienna. Until the end of October there were 27 quakes recorded and eight among them were felt by the residence. Figure 1 illustrates seismograms registered at the station CONA, situated in the Conrad-Observatory, while Figure 2 presents spectra for the CONA waveforms. The seismogram on Oct. 2 contains more high-frequency energy, compared to the one on Sep. 20. The spectral analysis for these two seismograms confirmed this observation. Higher spectral amplitudes can be found in a frequency range of 7-10 Hz on the Pg spectra in the range of 4-12 Hz on the Sg spectra for the quake on Oct. 2.

Seismicity in the southern Vienna Basin was mainly caused by a horizontal displacement along a deep-seated vertical fault, which pushes the eastern part of the crust towards the east. Focal mechanism studies from ZAMG (Figure 3) in cooperation with the Vienna University of Technology revealed a mainly lateral displacement for Sep. 20 quake, and similar solutions for the quake on Oct. 2 and the main shock from the swarm in 2000 at the same epicentre.

According to historical earthquake studies, Ebreichsdorf is a well-known epicenter for stronger earthquakes during the past centuries. The earliest quake documented for damages, occurred in 1590. The strongest quake with a magnitude of 5.0 took place in Ebreichsdorf in 1938. This quake resulted in damages to walls in almost all houses in the epicentral area. Some of the wall cracks were even centimeter wide. Chimneys were damaged. In Baden balustrades fell down, while in Vienna's district Favoriten

even some of the industrial chimneys collapsed. Another significant swarm occurred in Ebreichsdorf in 2000, which followed a shock on July 11 with a magnitude of 4.8. This main shock caused wall and plaster damages in many buildings in the epicenter.

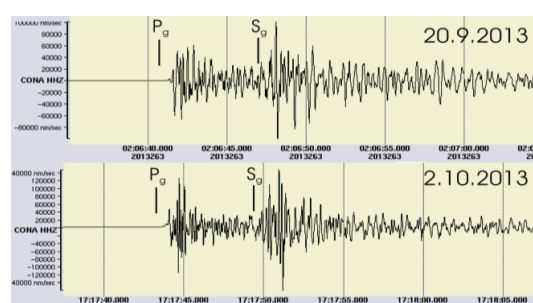


Figure 1: Seismograms of these two earthquakes recorded at CONA.

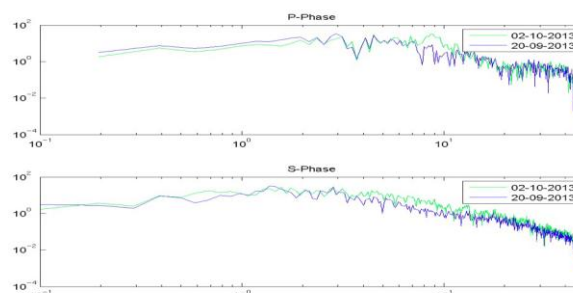


Figure 2: Comparison of spectra.

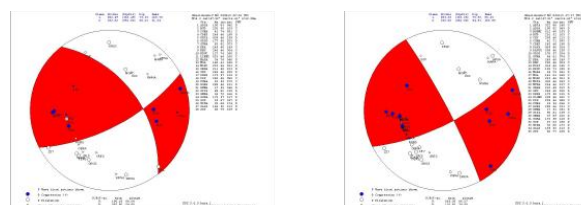


Figure 3: Focal mechanisms by ZAMG.

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