



The seismic event at Völkersen of November 22, 2012 - seismic observations and determination of focal parameters

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On November 22, 2012 at 20:38:12 UTC an earthquake of magnitude $M_L = 2.8$ occurred in the district of Verden near the village of Völkersen in Northern Germany. The event was felt by large segments of the population within a radius of about 20 km. Seismic signals could still be detected 600 km away at the seismic stations of the German Regional Seismic Network in the Bavarian Forest.

The epicenter of the current event is located near the boundaries of the natural gas field of Völkersen. In that area 4 events with magnitudes 1.9 to 2.9 have already taken place within the last 5 years. Similarly active is the area around the adjacent gas field of Söhlingen. There, the last event occurred on February 13, 2012 with a magnitude of 2.9 near the village of Visselhövede.

Despite their relatively small magnitudes these two groups of events are of particular interest: Their close spatial vicinity to the gas fields and the fact that the wider environment is considered to be almost aseismic suggest a connection with the local gas production as possible causes.

To investigate the causes of the events in more details, BGR set up 11 mobile seismic stations in the immediate vicinity of the known epicenters in collaboration with the Universities of Potsdam and Hamburg at the beginning of June 2012. The aim of the project is to obtain more accurate focal depths and focal mechanisms than before on the basis of the increased station number.

For the event of November 22, 2012 we were able now to compile an unique dataset of near focal and azimuthally well-distributed observations. First hypocenter determinations indicate a focal depth between 3 and 7 km, which is thus in the depth range of the natural gas extraction. Focal mechanisms calculated for a pure double-couple source and for the moment tensor will be presented and interpreted with respect to the fault systems in the region and to possible causes of the earthquakes.