



Seismicity in Northern Germany

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Northern Germany is a region of low tectonic activity, where only few and low-magnitude earthquakes occur. The driving tectonic processes are not well-understood up to now. In addition, seismic events during the last decade concentrated at the borders of the natural gas fields. The source depths of these events are shallow and in the depth range of the gas reservoirs. Based on these observations a causal relationship between seismicity near gas fields and the gas production is likely. The strongest of these earthquake had a magnitude of 4.5 and occurred near Rotenburg in 2004. Also smaller seismic events were considerably felt by the public and stimulated the discussion on the underlying processes. The latest seismic event occurred near Langwedel on 22nd November 2012 and had a magnitude of 2.8.

Understanding the causes of the seismicity in Northern Germany is crucial for a thorough evaluation. Therefore the Seismological Service of Lower Saxony (NED) was established at the State Office for Mining, Energy and Geology (LBEG) of Lower Saxony in January 2013. Its main task is the monitoring and evaluation of the seismicity in Lower Saxony and adjacent areas. Scientific and technical questions are addressed in close cooperation with the Seismological Central Observatory (SZO) at the Federal Institute for Geosciences and Natural Resources (BGR).

The seismological situation of Northern Germany will be presented. Possible causes of seismicity are introduced. Rare seismic events at greater depths are distributed over the whole region and probably are purely tectonic whereas events in the vicinity of natural gas fields are probably related to gas production. Improving the detection threshold of seismic events in Northern Germany is necessary for providing a better statistical basis for further analyses answering these questions. As a first step the existing seismic network will be densified over the next few years. The first borehole station was installed near Rethem by BGR in October 2012.

The instrumental analysis like the determination of hypocenters, magnitudes and fault plane solutions whenever possible, is supplemented by macroseismic investigations based on reports by the public.