



Microseismic events in the vicinity of the natural gas fields of Verden in Northern Germany

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During the last years several microearthquakes occurred in the vicinity of Verden/Aller in Northern Germany. The strongest of these events had a magnitude of $ML = 2.8$. The most recent event took place on 2nd May 2011. Despite the small magnitude of $ML = 2.5$ the event was felt by numerous inhabitants of the surrounding villages. Up to now, the possible source of the events is still under debate.

The epicenters of the Verden events are located in an almost aseismic area of Northern Germany and therefore of particular interest despite their small magnitudes. The events are in close vicinity of the natural gas fields of Völkersen as well as to several tectonic faults. This makes it rather difficult to distinguish whether the microearthquakes are purely tectonic, triggered, or induced events.

We present source parameters derived from the analysis of instrumental and macroseismic data. The epicenters could be determined with high accuracy. However, other important parameters required for a discrimination of the source type, such as focal depths and focal mechanisms, are of lower accuracy. This is mainly due to sparse station coverage in the area and relatively bad signal-to-noise conditions as a result of thick sedimentary layers beneath our stations. Overall, focal depths are found to be rather shallow in the range of 2 to 10 km. Focal mechanisms exhibit NW-SE oriented nodal planes being in relatively good agreement with the strike direction of the Allertal lineament which marks as well the southwestern boundary of the natural gas fields.