



Recent Seismicity below the East Eifel Volcanic Field, Germany

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The last volcanic eruptions in the East Eifel Volcanic Field (Germany) occurred just 11-12 thousand years ago. Today, degassing, microseismic activity, uplift and a partial melt reservoir in the upper mantle are observed. The improvement of the seismic network in the Eastern Eifel region and the nearby Neuwied basin significantly lowered detection thresholds and improved location accuracies of microseismic earthquakes. Most seismicity occurs on the NNW-SSE-striking Ochtendung lineament which is located just east of the Laacher See volcano and which is interpreted as the westernmost normal fault of the Neuwied Basin. In the tectonic stress field the nearly continuous microseismic activity on the Ochtendung lineament might be triggered by magmatic volatiles which rise from the mantle and which are observed as CO₂ degassing at the surface. An evidence for a deep-reaching volatile pathway from the mantle are surprisingly deep hypocenters: two earthquakes occurred in the upper mantle at around 40 km depth (ML=0.7-0.9) in 2013 and in October 2017 another four events occurred within less than one minute at around 35 km depth (ML=0.8-1.1). For details see: www.erdbebendienst-suedwest.de

Another recent peculiar observation are long-period (LP) seismic events which were firstly observed in April 2015 and again in June 2017. Then a series of around 50 LP-events were detected at around 20-25 km depth (magnitudes up to ML=1.3). These events with a low frequency content of 1-4 Hz can be clearly differentiated from tectonic earthquakes. We speculate that their origin is related to the volatile-rock interaction and thus they are a proxy for ongoing magmatic processes at depth.