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# Young glacially-induced tectonic activity of the Osning Thrust in Central Europe

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A series of complex metre-scale faults and related fold structures are developed within the Upper Pleistocene alluvial-aeolian complex of the Upper Senne in northern Germany. They are exposed in a pit 1 km away from the Osning Thrust. Growth strata indicate a two-fold evolution of the structures. The faults began as normal faults and were later transformed into reverse faults, which resulted in the formation of small-scale inversion structures with a typical harpoon shape (Brandes et al., in review). OSL ages imply that the sedimentary succession was deposited during the Late Pleniglacial to Late Glacial between 29.3 $\pm$ 3.2 ka and 13.1 $\pm$ 1.5 ka (Roskosch et al., accept.). We postulate that these structures were caused by activity on the Osning Thrust, during the generation of the forebulge of the Late Pleistocene ice sheet. This led to normal faulting as a consequence of extension in the forebulge area. The OSL ages for the normal fault-related growth strata are in a range of 16-13 ka. Reverse movements occurred later during deglaciation, due to the N-S directed compressional stress field in N Germany. Numerical simulations of the deglaciation seismicity point to seismic events with a thrust mechanism in the study area between 15.5-12.3 ka, although normal faulting is also possible in this time period. In addition various soft-sediment deformation structures occur in the sand pits, including sand blows, clastic dykes and sills, dish-, flame-, and ball and pillow structures. The main driving mechanism for these structures were seismic shock waves. This implies that movement on the Osning Thrust caused earthquakes of a significant magnitude. The soft-sediment deformation varies along strike of the Osning Thrust. In the NW the above-mentioned soft-sediment structures were generated, whereas in a pit 5.5 km to the SE only minor diffuse flower- to antler-like dewatering structures occur. This might indicate that the epicentre of the Late Glacial seismic activity was closer to the NW (Brandes & Winsemann, in review). In the autumn of 1612, an earthquake took place in this area. It is very likely that this event is related to background seismicity on the fault, although the influence of the ongoing glacial rebound in Fennoscandia is also possible. The repeated occurrence of seismicity in the Late Pleniglacial/Late Glacial and in the 17th century indicates ongoing crustal movements along the Osning Thrust and sheds new light on the seismic activity of northern Germany.

References:

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