



Imaging of urban sinkhole structures - combination of P-wave and shear-wave reflection seismic profiling in the metropolitan region of Hamburg

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The investigated roof region of a salt diapir in Hamburg, northern Germany, suffers sinkhole activity that was accompanied lately by microseismic events in the Gross Flottbek quarter. Thus, a high geohazard potential is present which can only be evaluated if highly resolved structural data are available.

In addition to a shear-wave reflection seismic survey we performed with our shear-wave seismic system (ELVIS microvibrator, 120 m land streamer with 1 m SH-geophone distance), we also measured two P-wave reflection seismic profiles with the aim of imaging the top of the salt diapir. The LIAG- minivibrator and planted geophones of 5 m distance were used. The main profile runs along the major shear-wave line, the other crosses perpendicularly, so that a good areal coverage is given.

Top salt is suggested at ca. 180 m depth, which is slightly deeper than previously thought from gravimetric measurements and larger-scale modelling. However, the general dip of the salt flank is further corroborated by additional gravimetric measurements. The surface of the salt dome undulates in the 10 m-range. Variable continuity of reflective elements and amplitude further characterize the top salt surface, which will be discussed in the context of fault and subsidence structures revealed from the shear-wave seismic experiment.