



Shear wave velocity estimation of cover sediments by seismic array measurements (central Belgium)

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Since 1938, the Royal Observatory of Belgium has first held community inquiries and then online '*Did You Feel It*' inquiries to gain information on the distribution of felt events in Belgium. For small magnitude events, mostly a circular macroseismic distribution pattern related to the energy decay by increasing hypocentral distance has been reported. However, few moderate-magnitude earthquakes ($M_L > 4$) have caused an elliptical distribution pattern with higher macroseismic intensities in a consistent E-W direction and stronger intensity decay in a N-S direction.

The macroseismic map of the 2011 M_L 4.3 earthquake at Goch (Lower Rhine Embayment, Dutch-German border) also showed this E-W oriented distribution. Remarkably, in contrast to the NE of Belgium where this event was barely felt at close epicentral distances, many macroseismic reports were submitted in central Belgium at larger epicentral distances. This peculiar intensity distribution illustrates the important influence of the increasing thickness of the sedimentary cover above the basement rocks of the Brabant Massif from south to north.

We will discuss the variation of S-wave velocity with depth of the sedimentary cover. Seismic noise array measurements were performed at different strategic sites at which the thickness of the sedimentary cover systematically increases. From south to north, the chosen sites vary from simple one-unit-over-halfspace configurations, with a clayey alluvium or sandy deposits covering the basement rocks (thickness < 20 m), to multilayer configurations (thickness up to 100 m) with a more complex sedimentary column. Wireless array measurements are performed by conducting CMG6TD Güralp seismometers in a rectangular array network. Subsequent surface wave analysis is executed in GEOPSY by conventional fk- and SPAC analysis to generate dispersion curves that are inverted in Dinver into depth profiles.

Eventually, the resulting velocity profiles will help to evaluate the influence of sediments on strong ground motions experienced at the surface in Central Belgium.