

Geophysical Research Abstracts, Vol. 9, 00308, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00308
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Estimating crustal thickness in Belgium using Moho-reflected waves.

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We present the results of the determination of the Moho depth underneath Belgium using reflected P and S-waves (PmP- and SmS-waves). Previous studies suggest differences of the Moho depth in the different parts of the region. In the lower Rhine Embayment in the northeast, the Moho depth is considered to be shallow (25 km). In the Brabant Massif in the west the crustal thickness is supposed to be larger (up to 38 km). The southeast of Belgium is characterised by the Variscan allochthone, where the Moho depth is around 30 km. In this study, PmP/SmS-waves of ~ 150 well-located local earthquakes and explosions in the North Sea registered by 37 stations of the permanent seismic network and by mobile stations installed by the Royal Observatory of Belgium were used. More than 750 PmP/SmS-waves were modelled to determine the Moho depth with the following procedure. PmP-arrivals are picked and the locations of the PmP-bounce points are determined and mapped. Over this map a 20 x 20 km grid is placed and for each grid cell an iteration is performed to determine the Moho depth. The thickness of the crust varies between 25 and 36 km and is slightly shallower in the northeast of Belgium (28–30–32 km) than to the southwest (33–34 km). Underneath the Brabant massif however Moho depths of 31 km are found, which is in contradiction with previous results.