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Integrated wide-angle and near-vertical incidence seismic investigations in the Polish Basin

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The GRUNDY experiment has been carried out in June 2003 within the framework of the SUDETES 2003 deep seismic sounding experiment. In the 50 by 10 km rectangular area, located in W part of the Polish Basin, ca. 800 RefTek 125 ‘‘Texan” stations with 4.5 Hz geophones were deployed, forming high-density central line (receiver spacing 100 m, 50 km long, referred as G01 line) and additional 4 parallel profiles. 37 shot points were fired with the mean charge of 50 kg of chemical explosive. The data were recorded both inline and crossline, which allowed to perform a 3D tomographic modelling of the whole target area and a CDP processing along G01 line. The refracted arrivals were used to determine detailed 3D tomographic velocity model in the survey area down to ca. 7 km depth. Initialy the reflection processing was focused on pre-Zechstein strata and thus it was confined to the first 6.5 s TWT. Here we extend our interest to 20 s TWT to obtain the image of the Moho interface by NVI reflections. Since the G01 line coincides with the S01 line of the SUDETES 2003 experiment, we have a good opportunity to compare the Moho depths as obtained from the CDP processing and from the reflection tomography based on PmP recordings along the S01 line. We observe Moho deepening toward the basin axis from ca. 30 to 32.5 km (10.5-11.5 s TWT), which is slightly less than on the nearby profile P4 from the POLONAISE’ 97 experiment. The difference between NVI/WA Moho depths is ca. 2.5 km, which is in the range of the assumed error for the tomographic method used. Joint inversion of NVI/WA Moho reflections produces Moho interface closer to the one observed in stacked section, thus the use of NVI reflections reduces the non-uniqueness of the tomographic solution. We tested also the prestack depth migration of the GRUNDY 2003 data using the 2D tomographic model from the S01 profile. The image is dominated by low-frequency migrated wide-angle reflections down to ca. 11 km depth.