



GRUNDY 2003: an integrated reflection-refraction experiment in the Polish Basin

M. Malinowski (1), L. Antonowicz (2), M. Grad (3), A. Guterch (1), E. Hegedus (4), E. Iwanowska (2), G. R. Keller (5), Z. Sliwinski (2), E. Takács (4)

(1) Institute of Geophysics, Polish Acad. Sci., Warsaw, Poland, (2) Polish Oil and Gas Company, Warsaw, Poland, (3) Institute of Geophysics, Warsaw University, Poland, (4) Eötvös Loránd Geophysical Institute, Budapest, Hungary, (5) University of Texas at El Paso, USA, (email: michalm@igf.edu.pl)

Recently a great progress has been made in acquiring wide-aperture seismic data in environments, where classical seismic profiling was not able to produce satisfactory results, eg. in areas of basalt flows or thick salt complexes. However, acquisition of long-offset data on land is still a challenge. The GRUNDY 2003 experiment, situated in central Poland, was targeted at recognition of the pre-Zechstein strata within the Polish Basin, as well as filling the gap in existing industrial seismic profiles. The Zechstein in the Polish Basin is a serious obstacle for seismic signals, thus for a successful investigations relatively low-frequencies and wide-apertures were used. The experiment design was based on the experience from similar survey performed in 2002 in the NE Hungary (Hajnal et al., 2004) which integrated refraction and reflection measurements for providing both the velocity and structural information. 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 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. This model was further used in the reflection processing, eg. for time-depth conversion. Despite the low CDP coverage, the

quality of the stacked data is good and several pre-Zechstein reflectors were imaged. The use of detailed velocity information essentially helped in the geological interpretation. The main conclusion of a regional geological and explorational importance is that beneath the Permian in the GRUNDY 2003 area, we observe the contact of the folded Variscan orogen with its foredeep filled with upper-Carboniferous molase rocks.