



High resolution seismic investigations of buried valleys in northern Germany

H.-M. Rumpel (1) and H. Wiederhold (1)

Leibniz Institute for Applied Geosciences, Hannover, Germany
(hm.rumpel@gga-hannover.de)

High resolution seismic surveys have been carried out to investigate buried valleys in northern Germany. Formed during the Pleistocene glaciations the valleys are now filled with Quaternary sediments and left no marks at the surface. Since several years buried valleys are discussed and sometimes already used as groundwater reservoir even though their complex interactions are not fully understood.

The BurVal project is an international approach in the Interreg IIIB North Sea Programme to study buried valleys in Denmark, Germany and the Netherlands and to characterise their physical properties, their ability to connect or disconnect aquifers and their vulnerability. Therefore high-resolution seismic lines have been recorded 2004 in two German project areas which are located south of Cuxhaven (northwest Germany, close to the Elbe estuary) and northwest of Hamburg. The length of the seismic lines ranges up to 3.7km. The P-wave vibrator of the Leibniz Institute for Applied Geosciences (GGA-Institut) was used to produce the source signal. Both the vibrator and geophone point spacing was 5m resulting in an CMP spacing of 2.5m.

The seismic lines in the Cuxhaven area cross the adjacent Oxstedt and Cuxhaven valleys. The valleys are clearly identified by the mapped valley flank and the different reflection pattern inside in contrast to the otherwise undisturbed horizontal layering. The interpretation of seismic reflectors as base of Quaternary is supported by borehole information. Even though the two valleys show similar seismic aspects, the gravity results differ.

A small side branch of the Ellerbek valley northwest of Hamburg is crossed by three seismic lines which show a clear deepening of the valley to the south. The valley fill is more heterogeneous compared to the Cuxhaven and Oxstedt valley. Beside seismic

recording, other geophysical surveys have been carried out such as gravimetry, aeromagnetics and electrical soundings which support the integrated interpretation of the results and help to characterise general valley properties.