Airborne Geophysical Investigation of the German North Sea Coastal Area

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ABSTRACT

In recent years airborne geophysical methods have turned out to have great potential in delineating subsurface information down to, e.g., 200 m depth. This information is essential for planning purposes for manifold geoscientific, economic or environmental questions, like, e.g., utilization and protection of fresh groundwater resources, land utilization or industrial planning. These data integrated into a three-dimensional geographical information system provide a perfect tool for spatial planning. Beside the geologic or geophysical basic information also changes of surface and subsurface data in time and space may be documented by repeated surveys. Especially electromagnetic induction is the most versatile of the airborne geophysical methods and widely applied in hydrogeological investigations because the measurements respond to both lithologic and water-chemistry variations. The applications include geologic mapping and aquifer structure, delineation of soil and groundwater salinization, salt-water intrusion into coastal aquifers etc.

In Germany, until today only small areas are covered by airborne geophysical surveys. Recently airborne geophysical data were gathered and interpreted for the mapping of buried valley aquifers (BURVAL Working Group 2006). Building on previous results and knowledge (e.g. Siemon et al. 2004 and 2007; Steuer et al. 2008; Siemon 2006) a general airborne survey of the German North Sea coastal area is projected and started in 2008. Emphasis is placed on the mapping of freshwater-saltwater interfaces, saltwater intrusions and the evaluation of the coastal aquifers as well as on the mapping of freshwater discharge to the sea. With the mapping a basis for monitoring should be set up.

The data will be archived in the Geophysics Information System (FIS GP) of GGA-Institute (Kühne 2005) where a database subsystem for aerogeophysical data (electromagnetic, magnetic and radiometric data) will be designed. The interpretation and visualization tools of FIS Geophysik enable a common processing with ground based surveys and data from other methods. A powerful web-interface: (https://www.gga-hannover.de/app/fis_gp/startseite/start.htm) provides the data for the scientific community. Further access to all contents of FIS GP will be able by end of this year by the European portal for geophysical data developed in the EU project GEOMIND = Geophysical Multilingual Internet-Driven Information Service (Vértesy et al. 2007).

First results of freshwater-saltwater interaction of the German North Sea coastal area will be discussed in the poster.

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