Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04254, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04254
EGU General Assembly 2008

The first bathymetric maps of Lake Balaton (Hungary)

A. Zlinszky (1), G. Molnár (2) (3)

(1): Balaton Limnological Research Institute of the Hungarian Academy of Sciences, Tihany, Hungary (azlinszky@tres.blki.hu) (2) Department for Photogrammetry and Remote Sensing, Vienna University of Technology, Vienna, Austria (3) Space Research Group, Department of Geopyhsics, Institute of Earth Sciences, Eötvös Loránd University, Budapest, Hungary (gmo@ipf.tuwien.ac.at)

Archive maps are an important resource for determining the natural state of ecologically important regions. Balaton is a lake in Hungary with large area (594 km^2) and very shallow water depth (avg. 3.5 meters). The lake and the surrounding wetlands are highly sensitive to changes in the water regime. Water level was lowered by approximately 1 meter in 1863, cutting off large marsh areas from the water system of the lake. Information on the original shorelines, basins and water level is badly needed for understanding ecological and abiotic processes and for planning conservation and restoration efforts. The first survey focusing on Lake Balaton was led by Samuel Krieger in 1766. Krieger probably made a local geodetic system for the map. As the lake itself is elongated on ENE-WSW direction, and hilly areas are not far from the north and south shores, he could make a relatively accurate geodetic network. The resulting local coordinate system can be approximated as an oblique cylindrical projection. The map shows the shoreline of the lake with some bathymetric contour lines (probably based on experience from water level fluctuations). Wetlands, forests, agricultural areas, and settlements are depicted, and relief is indicated by hachures. Scanning of the map was difficult due to its large size (180 x 30 cm) but georeferencing was possible because main roads and settlements remain largely unchanged and could be used as ground control points.

The bathymetry of Lake Balaton was not mapped before the drainage, and water levels were not registered before 1863 either. The first bathymetric survey was completed in 1895, and was based on the stereographic coordinate system commonly used in Hun-

gary during the 2^{nd} half of the 19^{th} century. The geodetic datum of this system is Buda 1863 Datum. The map has an overprinted grid, and the gridlines show coordinates in viennese fathom. (The stereographic system at that time was simultaneously used with meters and with fathoms) Elevation was measured in meters, and leveling was connected to the national military triangulation network at 42 documented benchmarks. These were used as ground control points for georeferencing. The DEM of the lake bottom edited from the data points marked on the map provides an important basis for studying sediment accumulation processes and changes of the shoreline.