

Multi-Transducer Sediment Echo Sounder for 3D Documentation of Submerged Archaeological Sites – a Case Study at a Prehistoric Pile Dwelling at Lake Mondsee (Austria)

Erwin Heine (Austria)

Key words: Hydrography; lakes; archaeology; sediment structure; archaeological underwater prospection

SUMMARY

A test of high end hydrographic surveying equipment of different manufacturers were carried out at the prehistoric pile dwelling “See” at Lake Mondsee (Austria), regarding high-resolution echo sounding and detection of embedded archaeological objects. The pile field is situated in a small bay near the lake outlet, where the core area of the site is about 100m long, 40 m wide and between 1 m and 8 m deep.

Multi beam echo sounder systems (Kongsberg, Teledyne, R2sonic), motion sensors and positioning systems (iXblue, Leica, SBG, Septentrio) as well as a unique multi-transducer sediment echo sounder (Innomar) were tested during a three weeks measurement campaign in May 2016.

Bottom coverage, resolution and accuracy were subjects of the investigation as well as the ability to return more than a single point from a ping (multi detection), which is actually useful when surveying a surface with features sticking out of the ground, like piles.

Special attention was given to the parametric narrow-beam sub-bottom profiler (SBP) Innomar SES2000 quattro. This recently developed device consists of four transducers arranged as a line array of one meter length for high across-track data density. An area with an extension of 140 m x 40 m was measured using a survey line spacing of one meter.

Data gridding of about 160 SBP-echograms resulted in a 3D volume model (voxel model) with a grid cell size of 25 cm x 25 cm x 1 cm. This uniform lattice can now be visualized in 3D with any common volume rendering program.

Dynamical views as well as time slices enable a proper visualization of sediment structures and the

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localization of embedded objects, like archaeological remains, with a high resolution.

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