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Identifying of Sand and Mud Layers at Steinhuder Meer (20 km²)

Client: GLL Hannover – Domänenamt Hannover

Location: Steinhuder Meer

Scope of Work: Sounding tracks at right angles to the shore at distances of about 50 m. Sounding tracks parallel to the shoreline at a length of about 4,8 km each.

Methodology: Two-frequency-sounding (200 kHz/15 kHz), Positioning with DGPS Trimble 5700

INTRODUCTION

Main goal of this work was to identify differences between punting and echo soundings for a consolidated mud layer at Steinhuder Meer. Water depth at Steinhuder Meer, a typical lake of Lower Saxony is about 2.5m. In some areas up to 6 m with conglomerations of mud introduced by density driven currents. This study was made to determine whether the 15 kHz woofer is able to penetrate the mud layer completely.



Figure 1: Drawing of measured tracks north of Mardorf

METHODOLOGY

The accuracy of the positioning system (DGPS Trimble 5700 and Fahrentholtz BBES 200/15 two frequency echo sounder) attained horizontal +/-1,5cm and vertical +/-3cm. With this data a drawing of depths for the level of the mud layer (Fig. 2) and of the sand layer was made. The thickness of the mud layer (Fig. 3) was also calculated with this data.



Figure 2: Depths of the level of the mud layer



Figure 3: Differences of the level of the mud and sand layer

PUNTING AT REFERENCE POINTS

At selected points the thickness of the mud layer was measured with punts to compare with calculated differences.

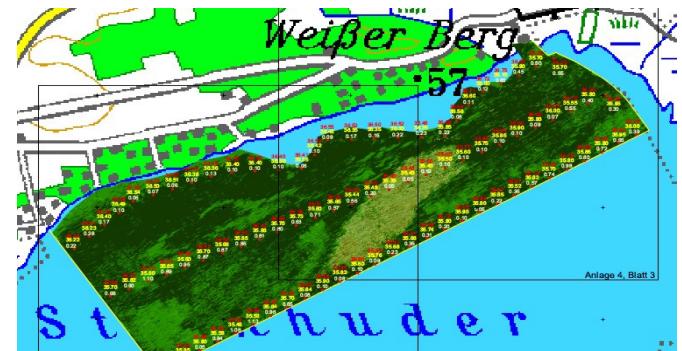


Figure 4: Overview of punting

RESULTS AND CONCLUSIONS

This study indicated, that a consolidated mud layer of more than 0,30 m thickness cannot penetrated completely with a 15 kHz woofer.

A test with different frequencies (5, 10 kHz) did not improve the penetration.

The test was repeated in another season, which showed that penetration extremely depends on methane concentration in the topping mud layer, which is a typical constellation in lakes of Lower Saxony.