



## Proxies of pre-industrial charcoal production and land use in lake sediments from South Brandenburg, Germany

Alexandra Raab (1), Alexandru Frantiuc (2), Brian Brademann (3), Florian Ott (3), Florian Hirsch (2), Achim Brauer (3), and Thomas Raab (2)

(1) BTU Cottbus-Senftenberg, Research Center Landscape Development and Mining Landscapes, Cottbus, Germany (raabalex@tu-cottbus.de), (2) BTU Cottbus-Senftenberg, Chair of Geopedology and Landscape Development, Cottbus, Germany, (3) Deutsches Geoforschungszentrum, Potsdam, Germany

During the last decades, archaeological research has revealed that large-scale charcoal burning was carried out in Lower Lusatia (South Brandenburg) situated within the North Germany Lowland. From the 17th to the 19th century, charcoal was mainly produced for the ironwork in Peitz. Within the framework of the ICLEA project lake sediments from two lakes, Byhleguher See and Großsee, are investigated to study the impact of pre-industrial charcoal production on the environment.

The investigation area is situated c. 15 km ne of Cottbus in the Tauerscher Forst, an area mainly forested with pine. The climate is continental (mean annual air temperature: 8-9 °C, mean annual precipitation sum: 565 mm). The geology and geomorphology were formed by Quaternary glaciations.

Two lakes, Großsee and Byhleguher See, were selected for our research. Großsee (51° 56,007' N, 14° 28,282' E, 63 m a.s.l., max. 9 m water depth) is c. 0.31 km<sup>2</sup> large and lies in the central part of the Tauersee Forst. Byhleguher See (51° 55,41' N, 14° 9,922' E, 50 m a.s.l., max. 1 m water depth) is situated in c. 22 km linear distance W of Großsee at the western margin of the Tauersee Forst. This lake is c. 0.89 km<sup>2</sup> large. During the last 50 years Byhleguher See and its surrounding was intensively used (fishing, wastewater discharge, agriculture).

Three short sediment cores were gained from each lake. All cores were opened, described and photographed. Magnetic susceptibility (split-core logger) and total element contents ( $\mu$ XRF) were measured on selected cores. Based on the first data, two sediment cores were chosen for further analyses (CNS, 14C-dating, etc.).

The sediment core from Großsee (GR13-SH-PO56) is 77 cm long. The sediments are quite homogenous and have a high organic content. S values are increased in the upper part (10-30 cm sediment depth) correlating with high magnetic susceptibility and iron values, which hint on the occurrence of pyrite in the sediment. 14C-dating of the sediment base (71-75 cm sediment depth) resulted in an age of 778-1018 AD ( $2\sigma$ , Poz-58091). The sediment core from Byhleguher See (BHG-13-1) is 107 cm long. Again, the sediments are homogenous and are rich in organics. CNS analyses are in progress. In the upper part high Fe and S contents ( $\mu$ XRF) correlate with high magn. susceptibility values hinting on pyrite. The base of the core (100-107 cm sediment depth) was 14C-dated to 1739-1531 BC ( $2\sigma$ , Poz-58092) and 2872-2471 BC ( $2\sigma$ , Poz-58093). Preliminary tests of charcoal particle contents of both sediment cores were carried out.

In conclusion, the sediments of Großsee and Byhleguher See are quite homogenous. An anthropogenic disturbance of the uppermost sediment part cannot be excluded. But, the 14C-datings resulted in reasonable ages, even though we cannot rule out a hardwater effect on the radiocarbon ages of Byhleguher See. Most probably, the cores contain the relevant time span (17th - 19th century), when charcoal was produced in the surroundings. Besides the CNS analyses and absolute age determinations, at present the focus lies on microscopic charcoal analyses.