



## **Analysis of land use changes over the last 200 years in the catchment of Lake Czechowskie (Pomerania, northern Poland)**

Sebastian Tyszkowski and Halina Kaczmarek

Institute of Geography and Spatial Organization Polish Academy of Sciences, Department of Environmental Resources and Geohazards, Toruń, Poland (sebtys@wp.pl)

Changes in land cover in the catchment area are, beside climate change, some of the major factors affecting sedimentation processes in lakes. With increasing human impact, changes in land cover no longer depend primarily on climate. In relation to research on sediments of Lake Czechowskie in Pomeranian Province in North Poland, land use changes over the last 200 years were analysed, with particular reference to deforestation or afforestation. The study area was the lake catchment, which covers nearly 20 km<sup>2</sup>. The analysis was based on archival and contemporary cartographic and photogrammetric materials, georeferenced and rectified using ArcGIS software. The following materials were used: Schrötter-Engelhart, Karte von Ost-Preussen nebst Preussisch Litthauen und West-Preussen nebst dem Netzdistrict, 1:50 000, section 92, 93, 1796-1802; Map Messtischblatt, 1:25000, sheet Czarnen, (mapping conducted in 1874), 1932; Map WIG (Military Geographical Institute - Wojskowy Instytut Geograficzny), 1:25000, sheet Osowo, (mapping conducted in 1929-31), 1933; aerial photos 1:13000, 1964, 1969; 1:25000, 1987; 1:26000, 1997; aerial orthophotomap, 1:5000, 2010. Today, over 60% of the catchment of Lake Czechowskie is covered with forests, dominated by planted Scots pine (*Pinus sylvestris*), while the remaining areas are used for agricultural purposes or are built up. The first cartographic materials indicate that in the late 18th c., forest covered almost 50% of the catchment surface. By the year 1870, there was a significant reduction in the forested area, as its contribution fell to 40%. Deforestation took place mainly between the main villages. In the 1920s the forest cover increased to 44%. Today, almost the entire lake is surrounded by forest and a wetland belt (at least 0.5 km wide). Deforestation in the catchment should not be attributed solely to logging because the area of Tuchola Forests (Bory Tucholskie) was repeatedly affected by natural disasters. In the 19th c. these predominantly included fires, while in the 20th c., mostly pest outbreaks were observed. Human activity in the catchment of Lake Czechowskie, shown in the cartographic materials from the late 18th and early 19th c., is also manifested by the creation of dams on the lake, which might have increased water level in the lake. The early 20th c., imaged on the map from 1933, was a period of intense change, leading to agricultural use of wetlands. They were drained by ditches, also in the Trzechowskie peatland. This study was supported by the Virtual Institute of Integrated Climate and Landscape Evolution (ICLEA) of the Helmholtz Association and the research project no. 2011/01/B/ST10/07367 Polish Ministry of Science and Higher Education