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Impact of water conditions on land surface subsidance and the decline of organic soils in Kuwasy peatland

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Organic soils as result of drainage undergo consolidation, mineralization, and subsidence of surface layer, and decline of organic matter. The rate of the subsidence of surface layer depends on a number of factors, such as ground water level, kind of peat, density of thickness of peat layer, drainage depth, climate, land use and drainage duration. These processes are connected with the changes of physical properties and lead to the conversion of organic soils into mineral-organic and mineral. The phenomena are observed in Biebrza, Notec Valley, and Kurpiowska Basin and Wieprz-Krzna channel. During last 42 years, in Kuwasy peatland from 10-13 ton per year was declined and the area of peatland decreased from 53 to 57 cm. It was observed that, peat moorsh soil of the first stadium of moorshification located on a middle decomposed peat transformed into peat-moorh soil of the second stadium of moorshification located on a high decomposed peat. However shallow peat soils were converted into mineral-moorsh and moorsh.

Kuwasy peatland was meliorated twice in XX century, first one in the middle of 30 and second one in 50. It led to the farther land surface subsidence and decline of organic matter.

The aim of this investigation was to evaluate the rate of land surface subsidence, decline of the area and the transformation of physic-water properties in peat-moorsh soil of different water conditions.

The investigations were carried out in Kuwasy peatland, located in Biebrza Basin North-East Poland. In peat soil samples ash contents, porosity, pF curves and bulk density were determined. The analysis of these results allowed to evaluate long-term soil subsidence and to relate it to soil water conditions.