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Dissolved organic carbon in soil solution of peat-moorsh soils on Kuwasy Mire

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The objective this study was the dissolved organic carbon concentration (DOC) in soil solution on the background of soil temperature, moisture and redox potential. The investigations were localized on the area of drained and agricultural used Kuwasy Mire, which are situated in the middle basin of Biebrza River, in North-East Poland. Research point was placed on a low peat soil of 110 cm depth managed as extensive grassland. The soil was recognized as peat-moorsh with the second degree of the moorshing process (with 20 cm of moorsh layer). The ceramic suction cups were installed in three replications at 30 cm depth of soil profile. The soil solution was continuously sampled by pomp of the automatic field station. The successive samples comprised of solution collected at the intervals of 21 days. Simultaneously, at the 20, 30 and 40 cm soil depths the measurements of temperature and determination of soil moisture and redox potential were made automatically. The mean twenty-four hours data were collected. The concentrations of DOC were determined by means of the flow colorimeter using the Skalar standard methods. Presented observations were made in 2001-2006.
Mean DOC concentration in soil solution was 66 mg.dm-3 within all research period. A significant positive correlation between studied compound concentration and temperature of soil at 30 cm depth was observed; (correlation coefficient - r=0.55, number of samples - n=87). The highest DOC concentrations were observed during the season from July to October, when also a lower ground water level occurred. The DOC concentration in soil solution showed as well a significant correlation with the soil redox potential at 20 cm level. On this depth of describing soil profile a frontier layer between moorshing layer and peat has been existed. This layer is the potentially most active in the respect to biochemical transformation. On the other hand it wasn't possible to shown dependences on the DOC concentration from soil moisture. That probably results from a huge water-holding capacity of these type of peat soils, which are keeping a high moisture content even at a long time after decreasing of the groundwater table.