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The Comparative Study of Element Accumulation in Wood Fen Peat (Latvia)

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Mires belong to the most representative archives of past environmental conditions in large areas of temperate and subarctic zone. Moreover, mires keep evidence of ancient cultures and modern human activity. Consequently the research of mires is an integral part of global change studies. Fens are less studied than bogs; one of the reasons is the complexity of factors that impact peat formation. Bogs, due to dome-shaped structure, are affected by precipitation, while other external influences are negligible and simply separable. The aim of this research was the characterization of accumulation patterns of metallic elements in wood fen peat profiles and to assess their accumulation regularities in relation with peat properties. The general idea was to find out how admixtures of plant remains in different stages of decomposition change properties and the element accumulation character in a wood peat. In obtained profiles were separated five types of wood peat: wood, wood-sedge, wood-reed, wood-grass and wood- sphagnum peat. Peat was sampled in four Latvian fens: Elki, Viki, Svetupe and Sala. Similar environment, origin and development of sites suggest similar development of peat properties thus there is no reason to assume different impact on peat development among mires. Despite a slow decomposition rate, results point to a higher decomposition degree of wood peat, in comparison with other types of fen peat. In average, wood peat forms the thickest layers, but it must be taken into account that thickness depends on coating layers, presence of decomposed plant remains etc. The accumulation pattern of metallic elements in a wood fen peat slightly differs among sites, but the difference among wood peat types is clearly evident. For instance, the highest amount of iron is characteristic to wood-reed peat, while, the lowest, is in wood-sphagnum peat. At the same time, in wood-reed peat the lowest amounts of magnesium were found while the highest amount of Mg was in wood-sedge peat. All sampled sediments are characterized as peat with high calcium content (>10g/kg). The highest content of calcium was evident in wood-reed peat, but the lowest was in wood-sphagnum peat. Also, the statistical analysis shows on a different pattern of accumulation among wood peat types. Correlations between elements are distinctly different among peat types. There are significant correlations between calcium and magnesium in all kinds of analysed wood peat, but the situation is different with other elements. For example, in wood-grass peat several element correlate with potassium (Fe, Mn, etc.), while in wood-sedge fen peat there is no significant correlations with potassium at all. In wood-sphagnum peat, with low saturation of iron, several elements significantly correlate with iron (Mn, Co, etc.). The presence of moss remains in peat decreases the accumulation of particular elements. There is a reason to believe that plant remains in botanical composition of fen peat, which are characteristic for raised bogs reduce the absorption capacity, but the presence of fen plant remains in turn increase accumulation abilities, thus fen peat is more saturated with chemical elements.