

Paweł Telega

Folic Histosols - genesis, properties and ecological role in mountain ecosystems

Abstract

The aim of the study is to determine the conditions of occurrence and distribution of Folisols in the mountainous regions of the Sudety Mountains (Góry Stołowe, Karkonosze), to identify the factors determining their formation in their present form and location, and their role in mountain ecosystems. The results of the studies allowed analysing the relations between the composition of preserved organic remains, degree of humification, physicochemical properties of these soils and the dominant plant habitat, altitude above sea level, thickness and spatial distribution of these soils.

The morphology of Folisols is variable and depends on a number of factors, which may include the bedrock, climatic conditions and the composition of primary organic matter. They are also characterised by variability within plant communities, often occurring in complexes with weakly developed soils such as Rankers or raw mineral soils. The processes of formation of Folic Histosols soils can follow a variety of scenarios, from *in situ* accumulation to highly dynamic mechanisms associated with rapid changes in local ecosystems. Radiocarbon dating ^{14}C allowed to determine the age of the Folisols. These soils are mostly young, up to a few hundred years old, but in the specific conditions of the rough and humid climate of the subalpine zone, soil horizon more than 2000 years old have been recorded.

Folisols are mostly low-ash content soils, with high total porosity with a significant amount of macropores. These characteristics determine the soil's retention capacity and significant leachability, which is more intensive for less decomposed litter. This property is associated with low bulk density, reaching the highest values for epihumic horizons. Litter materials are also characterised by a very strong hydrophobicity, partly moderating water properties.

Folic Histosols contain significant amounts of organic carbon, making them an important source of organic carbon in mountainous areas. Low pH values and chemical properties, determined by sorption properties and phosphorus content, indicate low trophicity of these soils. This promotes the development of dystrophic acidophilous vegetation, which is additionally adapted to harsh climatic conditions. The effect of mineral weathering and bedrock on the chemical properties of litter horizons has not been demonstrated. Chemical parameters are modified by differences in the composition of organic matter and biological mechanisms of element concentration in foliage.

Folisols are different from other organic soils, especially Peat and Murshic soils. Some of the analytical methods for assessing peat decomposition are not appropriate for Follic horizons. However, in some cases epihumic horizons, especially in subalpine zone, show considerable similarity to peat horizons. This situation is related to increasing water saturation and different aerobic conditions. Knowledge of the precise mechanisms of formation of Folisols requires further field studies about the dynamics of changes in their moisture content.