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Accumulation of organic matter in anthropogenic soil profiles derived at subalpine zone in Sudety Mts, as affected by touristic activity

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Modification of soil organic matter properties caused by change of land use in mountain areas have been investigated by several authors, while influence of anthropogenic effects connected with tourist activity are weakly recognized. The aim of this research was to asses soil environment changes resulted from activity of mountain tourist station, working for about one hundred years. The area of investigation was surroundings of mountain station, situated at elevation of 1,175 m, in subalpine zone of Karkonosze Range, Sudety Mts, SW Poland. The soil environment around the station is affected by coal and gas combustion, station buildings maintenance as well as on-site wastes and sewage disposal. The objects of the investigation were 11 soil profiles located in distance of 25 till 400 m from the station, including 9 soils derived under meadow dominated by sorrel (Rumex alpinus), and 2 soils derived under native mat-grass (Nardus stricta) meadow. Soil samples were collected from each genetic horizon, and the following properties were determined: soil texture, pH, exchange acidity in 1M KCl, exchange bases in 1M NH4Ac, CEC as a sum of exchange acidity and exchange bases, Corg by Tiurin method and Nt by Kjeldahl method. Originally, all examined soils were podzols derived from granite, so they contained significant amount of granite gravels, from 20% in surface, till 90% in lower part of profile. Soil material indicated sandy loam and/or silt loam texture. Native soils characterize by compact organic horizons consisting of roots and grass remnants (turf horizon), typical for subalpine meadow soils. They indicated thick ectohumus horizons and luck of humus horizons. Touristic station activity caused an increase of soil pH, base saturation and decrease of exchange acidity. Changes in soil properties result in expansion of synantropic plants, particularly sorrel, which dominated mat-grass and replaced original meadow commu-

nity. Due to anthropogenic activity, several soils located near mountain station were transformed into anthrosols. They have no turf horizons, and well developed humus horizons of thickness up to 60 cm. This modification in soil morphology was complex, connected partly with slope processes, as well as eutrophication resulted from wastes and sewage disposal. Plant species influence soil organic matter properties through the feedbacks of litter quality and quantity. In result of bigger input of sorrel litter, which additionally is easier to humify than that of mat-grass, an increase of soil humus substances is noticed. Soil material in A horizons of these soils - due to enrichment in Ca cations and Ca-bounded humic substances - indicated better developed structure. Apart of changes in morphology, described soil profiles differ from virgin soils by lower values of C/N ratio, especially in ectohumus and humus horizons, indicating more dynamic transformation of sorrel remnants. However, processes of organic matter transformation may be additionally influenced by activity of mountain station, contributing to changes in soil reaction and base saturation as well as mixing of soil material with wastes rich in organic matter, nitrogen and phosphorus.