Transformation of iron forms during soil formation after tree uprooting in a natural beech-dominated forest

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References

Introduction
Windthrows represent one of the most important disturbances in forest ecosystems. The parts of windthrows (pit, mound) represent ecologically unique microsites in forest stands, with specific erosion-sedimentation regime and essential impact on terrain microtopography.

Iron forms keep changing in time reflecting the soil formation.

Locality
Locality: Natural fir - beech forest Razula
Soil samples were taken in five depths (3, 15, 30, 50 and 80 or 100 cm) in three positions of windthrow (Fig. 1.) - mound, pit and undisturbed part as a control (Šamonil et al. 2008a,b)

Iron forms analysis
- single extraction - exchangeable, crystalline, amorphous together with organically complexed Fe (Šamonil et al. 2010) and total content
- voltammetry of microparticles (VMP)
- diffuse reflectance spectroscopy in the near IR-Vis-UV region (DRS)
- powder X-ray diffraction

Mineralogical composition of soils
The prevailing mineral - quartz (about 57 %)
Less abundant - albite (about 26 %) and muscovite (about 11 %)
Accessory - tannite, chlorite, biotite and nitrile

VMP Iron forms - 20 years old windthrow
- metastable Fe(III) oxides and poorly ordered goethite

DRS - Ratio Fe²⁺/Fe³⁺

Conclusions
These results can be used for creation of pedogenetic models describing forest soil evolution
Silicate bonded Fe²⁺ and Fe³⁺ (ratio Fe²⁺/Fe³⁺) exhibits almost the same distribution over the soil profile and windthrow microsites (pit and mound)

Generally, with increasing of soil profile the ratio of Fe²⁺ to Fe³⁺ increases

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