Excursion point 3: Brown forest soil on slope of ice pushed ridge

Unit on Soil Map of the Netherlands (1:50.000), sheet Wageningen gY30 VII

Landscape: This profile is located on the eastern part of Wageningen, on the lower part of the ice pushed ridge. It borders the area with anthropogenic soils. For centuries farmers have collected coppice and litter from the deciduous trees and mixed it with the manure in the stables. The mix of this material was brought on to the fields of the slightly sloping western and lower part of the ice pushed ridge. Due to the export of nutrients by extraction of coppice and litter from the system, the soil has impoverished over time. The reverve of weatherable minerals has decreased. This land management system concentrated biomass and nutrients from a large natural (uncultivated) area to enrich and maintain the fertility of a smaller area of arable land. Vegetation was collected over an area about 7 times the size of the cultivated field. This system was at the cause of large scale land degradation.

Profile:

A1 0 - 5 cm: colluvial mineral material, sandy loam (SL);
2O 5- 10 cm: burried litter layer, poorly decomposed oak litter; the layer is absent in some parts of the profile;
2Ah 10 - 15 cm: humus rich top soil, l0YR 2/1 (moist); sandy loam (SL); structureless; bio-pores not visible; many roots throughout;
2Bw 15 - 30 cm: 10YR 5/8 (moist); sandy loam (SL); structureless; bio-pores not visible; many roots throughout;
2BC 30 - 70 cm: 7.5YR 5/8 (moist); sandy loam (SL); structureless; bio-pores not visible; many roots throughout;
2C 70 - 91 cm: l0YR 7/4 (moist); loam sand (LS); structureless; bio-pores not visible; many roots throughout;

Data (indicative)

depth	clay%	silt%	fine sand%		coarse sand%	pH-H2O Org C%
0- 5 cm	-	-	-	-	-	-
5- 0 cm					3.7	25.1
5- 10 cm	4	7	6	83	3.7	3.7
15-30 cm	4	9	8	79	4.3	0.5
30-70 cm	3	8	6	83	4.5	0.5
70-91 cm	2	6	4	88	4.4	0.1

The ice pushed ridge has an elevation to a maximum of 55 above mean sea level. It is composed of pushed preglacial, fluviatile sediments. The top layer was homogenised in the Weichselien by periglacial slope processses tot a (weak) loamy, sandy and pebble rich mixture. The infiltration rate is high and the groundwater level is meters below the surface. The soil contains a few percent of clay and loam and therefore it contains more weatherable minerals than the soils on the wash out plain to the east of this site. The soil has acidified over time. This, and the deep drainage of these soils, favoured the formation of brown forest soils. (Dutch classification: moderpodzols). The term in Dutch soil classification is confusion. The term moderpodzol is the officiële Dutch soil name and it suggests the e- and illuviation of moderhumus (excreta of soil fauna). This appeared not to be correct. Important soil processes are the weathering of primary minerals in the process of which iron is liberated (orange color) and homogenisation in which the moderhums is incoporated into the soil by soil fauna (gray color). The combination of the two colors results in a brown appearance. The sensitity of this soil for nutrient leaching and impact of polluting substances is high as the exchange capacity and pH of the soil are low. Growth of deciduous trees on these soils is medium to good.

Classification

WRB 2015: Dystric, Brunic Arenosol (Aeolic, Ochric, Nechic, Areninovic)