



Occurrence, soil parameters and genesis of Rhodic Arenosols ('Fuchserden') in northeastern Germany

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The formation of hematite in soils (rubefication) is a characteristic feature of soils from the Mediterranean or from tropic environments, but rubefied soils are also mapped on the late Quaternary sediments from Central Europe. In the sandy deposits from the Late Pleistocene in the Northern European lowlands, the local appearance of red subsoils emerges the question of their formation and palaeoenvironmental significance. According to the WRB these red soils in northeastern Germany are classified as Rhodic Arenosols, but in the German Guidelines for Soil Mapping this soil is still unconsidered because the age and genesis is unclear. Due to the intense red subsoil, the working title of this soil in Germany is 'Fuchserde'. Whereas rubefication is a characteristic feature of soils in regions with warm and dry summers, the occurrence of red subsoil horizons containing hematite in soils in northeastern Germany is not an indicator for tropic or Mediterranean climate conditions. Already the appearance of Rhodic Arenosols on sandy deposits from the last glaciation objects earlier theories that consider these soils as a relictic soil formation from the last interglacial or even the Palaeogene or Neogene. Our findings from soil micromorphology, magnetic susceptibility, and the identification of the iron(hydr)oxides by FTIR prove that our studied Rhodic Arenosols are dominated by hematite, although goethite and to some extent maghemite is present. The total iron contents of the studied Rhodic Arenosols and their local occurrence next to Fluvisols, Gleysols, and Podzols strongly suggests the importance of a lateral input of iron for the genesis of Rhodic Arenosols in northeastern Germany. Considering the importance of lateral input of iron compounds for the formation of Rhodic Arenosols, our study sheds new light on the genesis of soils in Central Europe that are also characterized by a characteristic iron dynamic like the 'Ockererden', 'Hang-Stagnogleye', 'Lockerbraunerden', or soils formed by lateral podsolization.