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# The use of magnetic susceptibility and viscosity measurements as a mapping tool for soil properties: DIGISOIL field results

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The clay (paramagnetic) and iron oxides (ferrimagnetic) contents carry the magnetic properties of soils. Changes in the local redox conditions influence the iron oxides fatum and, then, the magnetic properties of soils. Consequently, many processes (air circulation, microbial activities, heavy metal accumulation...) can influence the magnetic behaviour. The aim of this study is to evaluate which soil property(ies) (carbon content, bulk density, clay content...) can be mapped with the help of magnetic properties measurements (magnetic susceptibility, magnetic viscosity and there ratio). The survey has been achieved on the validation site defined in the DIGISOIL project and located in Luxembourg. This site is about 4 ha in area, it is cultivated and ploughed. We made 231 measurements with 5 devices (MS2D Bartington ltd, DECCO, TS6 Protovale, CS60 and VC100 prototype) in 7 configurations. 30 calibration cores were also collected to characterize soil properties (carbon content, clay content, stone content and water content) in the field. The results are used to analyse the relationship between soil and magnetic properties. When a relation appears, soil property maps derived from magnetic property ones are plotted and confronted with collected sample results.