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# The importance of magnetic methods for soil mapping and process modelling. Case study in Ukraine

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The correct planning of agriculture areas is fundamental for a sustainable future in Ukraine. After the recent political problems in Ukraine, new challenges emerged regarding sustainability questions. At the same time the soil mapping and modelling are intensively developing all over the world (Pereira et al., 2015; Brevik et al., in press). Magnetic susceptibility (MS) methods are low cost and accurate for the developing maps of agricultural areas, fundamental for Ukrain's economy.This allow to colleact a great amount of soil data, usefull for a better understading of the spatial distribution of soil properties. Recently, this method have been applied in other works in Ukraine and elsewhere (Jordanova et al., 2011; Menshov et al., 2015).
The objective of this work is to study the spatial distribution of MS and humus content on the topsoils (0-5 cm) in two different areas. The first is located in Poltava region and the second in Kharkiv region. The results showed that MS depends of soil type, topography and anthropogenic influence. For the interpretation of MS spatial distribution in top soil we consider the frequency and time after the last tillage, tilth depth, fertilizing, and the puddling regarding the vehicle model. On average the soil MS of the top soil of these two cases is about 30-70×10-8 m3/kg. In Poltava region not disturbed soil has on average MS values of 40-50×10-8 m3/kg, for Kharkiv region 50-60×10-8 m3/kg. The tilled soil of Poltava region has on average an MS of 60×10-8 m3/kg, and 70×10-8 m3/kg in Kharkiv region. MS is higher in non-tilled soils than in the tilled ones. The correlation between MS and soil humus content is very high ( up to 0.90) in both cases.

Breivik, E., Baumgarten, A., Calzolari, C., Miller, B., Pereira, P., Kabala, C., Jordán, A. Soil mapping, classification, and modelling: history and future directions. Geoderma (in press), doi:10.1016/j.geoderma.2015.05.017

Jordanova D., Jordanova N., Atanasova A., Tsacheva T., Petrov P., (2011). Soil tillage erosion by using magnetism of soils – a case study from Bulgaria. Environ. Monit. Assess, 183, 381-394.

Menshov O. Pereira P., Kruglov O., (2015). Spatial variability of soil magnetic susceptibility in an agricultural field located in Eastern Ukraine. Geophysical Research Abstracts, 17, EGU2015-578-2.

Pereira, P., Cerdà, A., Úbeda, X., Mataix-Solera, J. Arcenegui, V., Zavala, L. (2015) Modelling the impacts of wildfire on ash thickness in a short-term period, Land Degradation and Development, 26, 180-192. DOI: 10.1002/ldr.2195