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

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Introduction

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. Soil mapping, modelling and soil magnetism are intensively developing (*Brevik et al., 2016; Pereira et al., 2015, Jordanova et al., 2011*).

Soil magnetism applying:

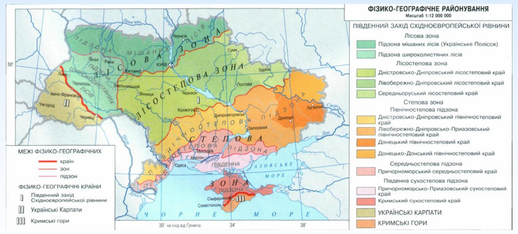
- Soil science and Agriculture
- Ecology and sustainable land use management
- Mineral prospecting, oil and gas prospecting and exploration
- Ecosystem services and warfare damage assessment
- Archeology

MS for soil mapping and process modelling:

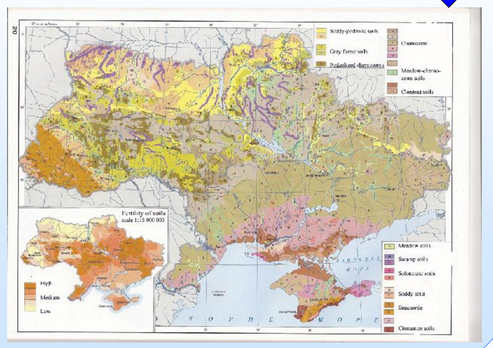
Magnetic susceptibility (MS) methods are low cost and accurate for the developing maps of agricultural areas

Soils of Ukraine

The main soil-climatic zones of Ukraine



Soil types: *Albeluvisols* (Soddy-podsolic), Phaeozems (Gray forest), *Kastanozems* (Chestnut), *Chernozems* (Leached, Typical, Ordinary, Southern, Meadow), *Gleysols* (Bog soils), *Cambisols* (Brawn and Mountains soils)



Study area

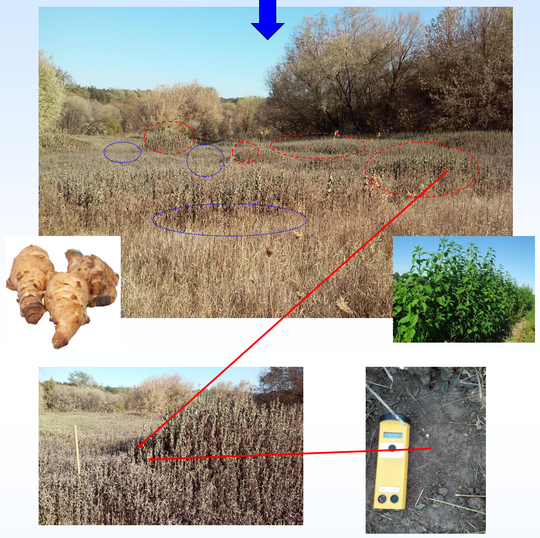


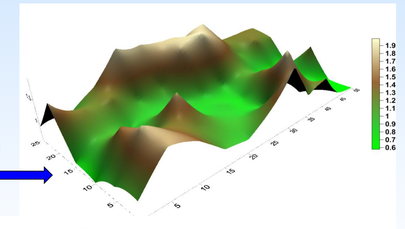
Figure 1. Study area and methods. Poltava region, Konony

Table 1. Descriptive statistics

	Magnetic susceptibility: MS, $10^{-8}m^3/kg$	Jerusalem artichoke: H, m
Count	66	66
Mean	60.2	1.2
Maximum	81	0.6
Minimum	39	2.0
Standard Deviation	9.3	0.41
Coef. of Variation	0.15	0.35
Median	60	1.1
Correlation	0.54	

Soil mapping and process modelling

Figure 2. The spatial distribution of the *Jerusalem artichoke* height: H, m



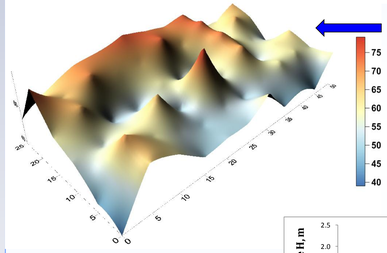
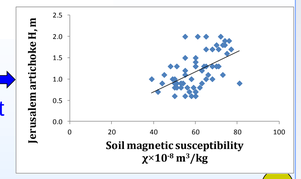


Figure 3. The spatial distribution of the soil magnetic susceptibility: MS, $10^{-8}m^3/kg$

Figure 4. Magnetic susceptibility and *Jerusalem artichoke* height correlation, K=0.54



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