

## **Spatial variability of total carbon and soil organic carbon in agricultural soils in Baranja region, Croatia**

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Climate change is expected to have an important influence on the crop production in agricultural regions. Soil carbon represents an important soil property that contributes to mitigate the negative influence of climate change on intensive cropped areas. Based on 5063 soil samples sampled from soil top layer (0-30 cm) we studied the spatial distribution of total carbon (TC) and soil organic carbon (SOC) content in various soil types (Anthrosols, Cambisols, Chernozems, Fluvisols, Gleysols, Luvisols) in Baranja region, Croatia. TC concentrations ranged from 2.10 to 66.15 mg/kg (with a mean of 16.31 mg/kg). SOC concentrations ranged from 1.86 to 58.00 mg/kg (with a mean of 13.35 mg/kg). TC and SOC showed moderate heterogeneity with coefficient of variation (CV) of 51.3% and 33.8%, respectively. Average concentrations of soil TC vary in function of soil types in the following decreasing order: Anthrosols (20.9 mg/kg) > Gleysols (19.3 mg/kg) > Fluvisols (15.6 mg/kg) > Chernozems (14.2 mg/kg) > Luvisols (12.6 mg/kg) > Cambisols (11.1 mg/kg), while SOC concentrations follow next order: Gleysols (15.4 mg/kg) > Fluvisols (13.2 mg/kg) = Anthrosols (13.2 mg/kg) > Chernozems (12.6 mg/kg) > Luvisols (11.4 mg/kg) > Cambisols (10.5 mg/kg). Performed geostatistical analysis of TC and SOC; both the experimental variograms as well as the interpolated maps reveal quite different spatial patterns of the two studied soil properties. The analysis of the spatial variability and of the spatial patterns of the produced maps show that SOC is likely influenced by anthropic processes. Spatial variability of SOC indicates soil health deterioration on an important significant portion of the studied area; this suggests the need for future adoption of environmentally friendly soil management in the Baranja region. Regional maps of TC and SOC provide quantitative information for regional planning and environmental monitoring and protection purposes.