

## Accepted Manuscript

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PII: S2352-0094(17)30003-2  
DOI: doi: [10.1016/j.geodrs.2017.07.002](https://doi.org/10.1016/j.geodrs.2017.07.002)  
Reference: GEODRS 131  
To appear in: *Geoderma Regional*  
Received date: 6 January 2017  
Revised date: 11 July 2017  
Accepted date: 13 July 2017

Please cite this article as: M. Zaouche, L. Bel, E. Vaudour , Geostatistical mapping of topsoil organic carbon and uncertainty assessment in Western Paris croplands (France), *Geoderma Regional* (2017), doi: [10.1016/j.geodrs.2017.07.002](https://doi.org/10.1016/j.geodrs.2017.07.002)

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# Geostatistical mapping of topsoil organic carbon and uncertainty assessment in Western Paris croplands (France)

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## Abstract

This study considers approaches for calculating and mapping statistical predictions of topsoil organic carbon (SOC) content and attendant uncertainty from data across a small region of Northern France, the Versailles Plain (221 km<sup>2</sup>). Cropland topsoil SOC content was modelled through a bootstrap resampling procedure: a set of 384 models were built from cokriging up to 3 soil properties (pH, iron content, plus five earth-size fractions, being clay, coarse sand, fine sand, coarse silt, and fine silt) with an external drift (DEM or a soilscape map). The approach provided estimation for the uncertainty globally and for each sample location, using a criterion of pointwise RMSE. The model exhibiting the lowest RMSE median of 3.17 g.Kg<sup>-1</sup> was the one including clay content and elevation covariates and had the highest validation R<sup>2</sup> (0.52). Highest uncertainties were observed at locations marked by OM inputs, past landuse, calcareous soils. This knowledge gives hints for further sampling and reachable bounds for further approaches that would incorporate spatial data on agricultural practices and past landuse.

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