Data Papers

CARBIOSOL: Biological indicators of soil quality and organic carbon in grasslands and croplands in Wallonia, Belgium

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Abstract. The protection of agricultural soil quality is critical to environmental sustainability and requires relevant indicators. Total soil organic carbon (SOC) is of importance for soil quality but its slow dynamic and inherent variability do not allow early detection of changes. The project CARBIOSOL provides a data set from agricultural soils in Wallonia (Southern Belgium), of total SOC, SOC fractions and biological indicators, selected for their relevance as indicators of soil quality. Two land uses (sampled in 2013), five agricultural regions (2015), seasonal variability in croplands (2016) and four management types (2017) were studied. Soil organic carbon content (total, stable fine fraction <20 μm, labile coarse fraction >20 μm), cold and hot water extractable carbon and nitrogen contents, total nitrogen, pH_{KCl}, pH_{H2O}, potential respiration, microbial biomass carbon and nitrogen, net nitrogen mineralization, metabolic potential of soil bacteria, earthworm density and biomass, and two ecophysiological quotients (metabolic and microbial quotient) were measured for a total of 415 samples. The present data set provides an important contribution for establishing a reference system of soil quality in Wallonia and eventually for large-scale studies through its integration into a global database. Moreover, the present data set could be used to support the interpretation of measurements of fractions of SOC and biological indicators by soil analyses laboratories, which will be useful for farmers and decision makers to evaluate the effect of different management practices. Information contained in this publication or product may be reproduced, in part or in whole, and by any means for personal or public non-commercial uses, without charge or further permission, unless otherwise specified. Users are required to exercise due diligence in ensuring the accuracy of the material reproduced, indicate the complete title of the material produced and refer to this publication (including author names), indicate that the reproduction is a copy/uses official work financed by the SPW-DGO3. Commercial reproduction and distribution is prohibited, except with written permission from SPW-DGO3 and publication authors.

Key words: agricultural soil; biological indicators; carbon fractions; cropland; database; grassland; soil microbial biomass; soil monitoring network; soil organic matter; soil quality; Wallonia.

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