



## Temporal and spatial variability of soil biological activity at European scale

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The CATCH-C project aims to identify and improve the farm-compatibility of Soil Management Practices including to promote productivity, climate change mitigation and soil quality. The focus of this work concentrates on turnover conditions for soil organic matter (SOM). SOM is fundamental for the maintenance of quality and functions of soils while SOM storage is attributed a great importance in terms of climate change mitigation. The turnover conditions depend on soil biological activity characterized by climate and soil properties. Soil biological activity was investigated using two model concepts:

- a) Re\_clim parameter within the ICBM (Introductory Carbon Balance Model) (Andrén & Kätterer 1997) states a climatic factor summarizing soil water storage and soil temperature and its influence on soil biological activity.
- b) BAT (biological active time) approach derived from model CANDY (CARbon and Nitrogen Dynamic) (Franko & Oelschlägel 1995) expresses the variation of soil moisture, soil temperature and soil aeration as a time scale and an indicator of biological activity for soil organic matter (SOM) turnover.

During an earlier stage both model concepts, Re\_clim and BAT, were applied based on a monthly data to assess spatial variability of turnover conditions across Europe. This hampers the investigation of temporal variability (e.g. intra-annual). The improved stage integrates daily data of more than 350 weather stations across Europe presented by Klein Tank et al. (2002). All time series data (temperature, precipitation and potential evapotranspiration and soil texture derived from the European Soil Database (JRC 2006)), are used to calculate soil biological activity in the arable layer. The resulting BAT and Re\_clim values were spatio-temporal investigated. While “temporal” refers to a long-term trend analysis, “spatial” includes the investigation of soil biological activity variability per environmental zone (ENZ, Metzger et al. 2005 representing similar conditions for precipitation, temperature and relief) to identify ranges and hence turnover conditions for each ENZ.

We will discuss the analyzed results of both concepts to assess SOM turnover conditions across Europe for historical weather data and for Spain focusing on climate scenarios. Both concepts help to separate different turnover activities and to indicate organic matter input in order to maintain the given SOM. The assessment could provide recommendations for adaptations of soil management practices.

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