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The magnetic susceptibility of European agricultural soils

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The GEMAS (Geochemical mapping of agricultural soils) project, a cooperation project between EuroGeoSurveys and Eurometaux, aims at providing soil quality data for Europe. Samples of arable soil were taken during 2008 at an average density of 1 site/2500 km^2 covering the member states of the European Union (except Malta and Romania) and several neighbouring countries (e.g., Norway, Serbia, Ukraine). While the primary aim of the GEMAS project is to produce REACH (Registration, Evaluation and Authorisation of CHemicals - EC, 2006) consistent soil geochemistry data at the continental scale, the data set is also optimally apt to provide the first continental scale overview of magnetic properties in European soils. Soil samples from the upper 20 cm were taken as composites from 5 sites spread over a ca. 100 m^2 area in a large agricultural field (Ap-sample). The samples were air dried and sieved to pass a 2 mm nylon screen. Weight normalized magnetic susceptibility of these dried samples was measured using a Sapphire Instruments SI2B susceptibility meter with dynamic background removal. The here presented maps of magnetic susceptibility in relation to geochemical composition and geological structures for the first time allow to outline the large scale influence of tectonics and climate on magnetic mineral concentration in European soils. The data set also provides the background variability for regional studies aiming to relate magnetic susceptibility of soils to local contamination sources.