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Greenhouse gas emissions of European croplands

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Agriculture is a significant source of greenhouse gas (GHG) emissions in Europe. Croplands contribute to this source, but these contributions are difficult to estimate, as the influencing factors are complex. Human management actions are even more important than environmental drivers for agricultural emissions, but spatially-explicit datasets are scarce. This causes a high uncertainty for GHG emission simulations. We simulated GHG emissions (2010-2015) for selected crops (wheat and maize) in Europe with the biogeochemical model platform SPATIAL ECOSSE, using spatially-explicit management data from the model CAPRI used by JRC and model approaches based on Waha et al. (2012) to derive spatial management data (grid maps) for EU27. First results reveal that emissions estimates are highly sensitive to soil organic carbon (SOC), which results in hotspots of GHG emissions in northern Europe where SOC content is high. This effect is stronger for wheat than for maize. The first results show changes in SOC ranging from 374 --456 g C m² yr⁻¹ and 317 to 399 g C m² yr⁻¹ across Europe (EU27) for wheat and maize, respectively, which are larger than the values reported in previous studies (e.g., 299 g C m² yr⁻¹ by Ciais et al., 2010).

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