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Spatio-temporal detection of agricultural parcels affected by soil erosion

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The monitoring of extreme weather events is crucial to adapt measures for farmers, support decision making and refining soil policies especially in the context of climate change. A precondition for an effective monitoring is the availability of indices representing the spatiotemporal dynamic of influencing factors like precipitation and soil coverage.
Against this background, we introduce a core algorithms of the „Extreme weather Monitoring and Risk Assessment“ tool (EMRA), which enables a dynamic geodata integration as well as the spatial and temporal identification of extreme weather events in Germany.
On the example of the county Uckermark, which is situated in north-eastern Germany, and the crop type winter wheat, we present a process chain for the derivation of a dynamic precipitation and soil cover index for specific phenological phases and parcels. The algorithm couples Germany-wide phenological information, MODIS satellite imagery as well as daily data sets of precipitation (Gerstmann et al. 2016, Möller et al. 2017). The resulting database allows the localization of historical and current hot spot parcels, which show a potentially high risk of soil erosion during sensitive crops’ growing periods. I doing so, more complex soil erosion models can be parameterized in an efficient and focused manner (Volk et al. 2010) or more detailed assessments can be made by using high resolution data. This includes the detection of soil surface’s changes by remote sensed imagery or the comparison of terrain surfaces before and after rainfall events using digital elevation data.

References

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