SPATIO-TEMPORAL MODELING AND MONITORING OF EXTREME WEATHER EVENTS AND CONDITIONS

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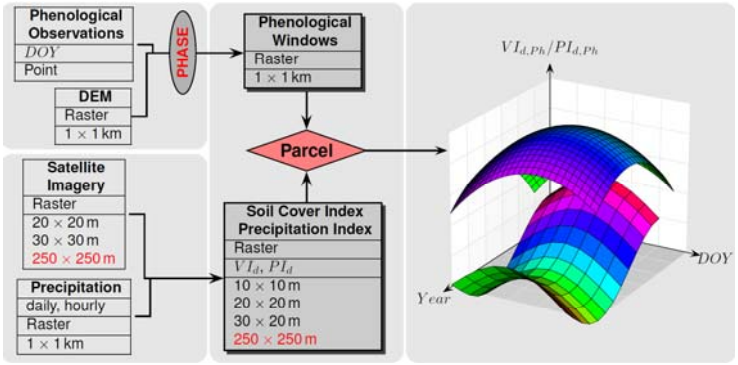
Introduction

The monitoring of extreme weather events is crucial to adapt measures for farmers, support decision making and refining soil policies. Since soil erosion by water is an event-related phenomenon, an effective monitoring of soil erosion effects require the availability of indices representing the spatio-temporal dynamic of influencing factors like precipitation or soil coverage (Möller *et al.* 2017). Precipitation data and satellite indices as proxies for soil coverage are increasingly available in high temporal and geometric resolutions. Thus, solutions are needed for an efficient data coupling and analysis.

Methodology



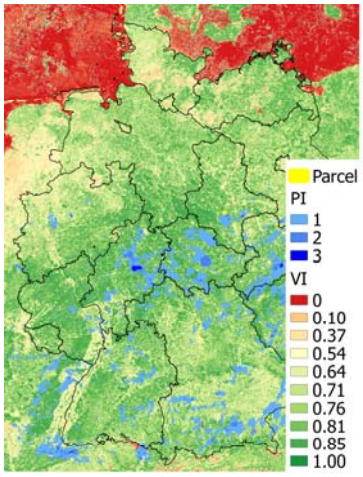
Workflow for the derivation of parcel-specific time series of phenological soil cover and precipitation data (*DOY* – day of the year | *DEM* – digital elevelation model | VI_d – daily vegetation index | PI_d – daily precipitation index)

PHASE model: automatic and dynamic determination of phenological windows (Gerstmann et al. 2016) → Germany-wide raster data sets of beginning phenological events

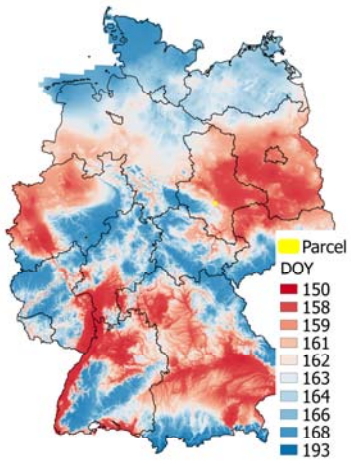
MODIS vegetation index (*VI*): MOD09Q1 product, since 2000, temporal resolution 8 days, geometric resolution 250 m² → proxy for historical and up-to-data parcel-specific soil coverage information (https://modis.gsfc.nasa.gov/data)

Precipitation index (*PI*): geometric resolution 1000 m², since 2006 → temporally aggregated precipitation data (RADOLAN) expressing the number of hours per day exceeding a threshold of 10 mm (ftp://opendata.dwd.de/climate_environment/CDC/grids_germany/5_minutes/radolan)

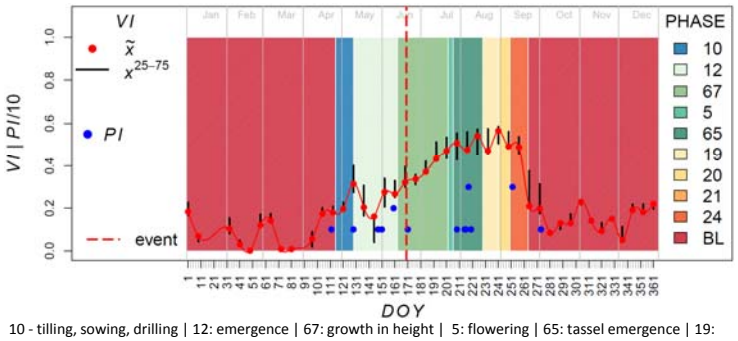
Parameterization of soil erosion events



Precipitation and vegetation index for *DOY=160* in 2013



Interpolated beginning phase "growth in height" of Maize in 2013



10 - tilling, sowing, drilling | 12: emergence | 67: growth in height | 5: flowering | 65: tassel emergence | 19: milk ripeness | 20: wax-ripe stage | 21: yellow ripeness | 24: harvest

Parcel-specific phenological windows and *PI*/*VI* time series for Maize in 2013

Soil erosion event reported on 19th June 2013 (*DOY*=170)

References

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