IECL 2022

RAINFALL EROSIVITY AND EROSIVITY DENSITY IN THE CENTRAL AND SOUTHERN PANNONIAN BASIN

MDPI land

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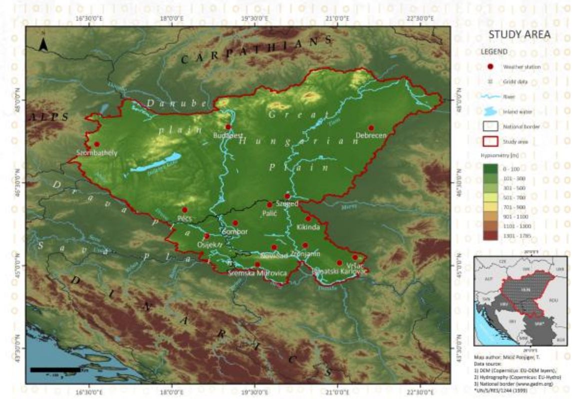
INTRODUCTION

As Pannonian Basin is an intensive agricultural area, the present study aims to understand better soil loss in the light of precipitation variability by observing the rainfall erosivity (*RE*) and erosivity density (*ED*). Despite limited data in the Western Balkans, this research strives to fill a gap in information for the central and southeastern parts of the Pannonian Basin in SE Europe (northern Serbia-Vojvodina, Hungary and eastern part of Croatia) by using two diferent databases.

The main objectives of the study are:

(1) to investigate spatial-temporal trends and variability,

(2) to emphasise the importance of the influence of the large-scale processes of climate variability.



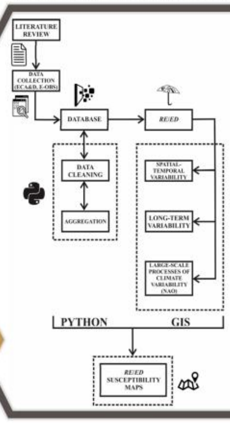
ECA&D

- RR in 0.1 mm
- 14 stations
- only validated measures (QC = 0)
- time series 1961-2014

E-OBS

- RR in mm
- 225 grids
- version 23.1.e
- resolution 0.25°x0.25°
- time series 1961-2014

RESEARCH WORKFLOW



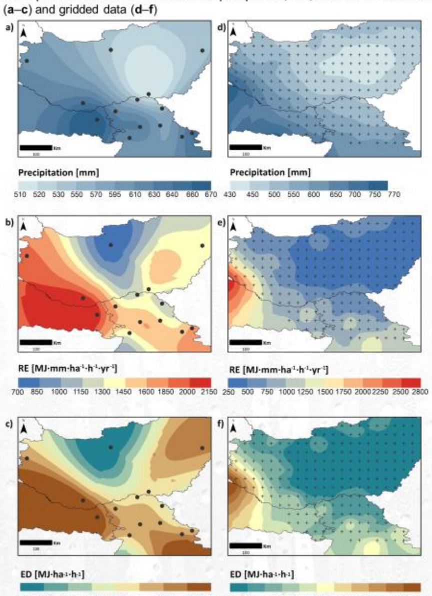
$$RE_i = \alpha \sum_{j=1}^{k} (P_j)^{\beta}$$

$$\beta = 0.8363 + \frac{18.177}{\overline{P}_{d12}} + \frac{24.455}{\overline{P}_{y12}}$$

$$\alpha = 21.586\beta^{-7.1891}$$

$$ED_i = \frac{RE_i}{P_i}$$

>>> Spatial distribution of mean annual precipitation, *RE*, and *ED* for station data (**a–c**) and gridded data (**d–f**)



MAIN RESULTS

Annual *RE* and *ED* based on station data are following the spatial pattern of precipitation distribution, with higher values in the southwest and southeast (2100 – 1650 MJ·mm·ha^{-1}·h^{-1}) of the study area, to the minimum values in the northern part (700 MJ·ha^{-1}·h^{-1}). As expected, the gridded dataset displays more precise *RE* and *ED* spatial-temporal variability, ranging from minimal 250 to maximal 2800 MJ·mm·ha^{-1}·h^{-1}.

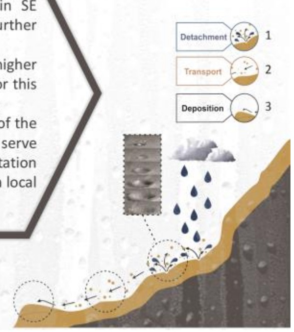
The long-term trends at the annual level are showing an increasing value of *RE* (from 0.20 to 21.17 MJ·mm·ha^{-1}·h^{-1}) and *ED* (from 0.01 to 0.03 MJ·ha^{-1}·h^{-1}). The observed tendency for the autumn *RE* (from 5.55 to 0.37 MJ·mm·ha^{-1}·h^{-1}) and *ED* (from 0.05 to 0.01 MJ·ha^{-1}·h^{-1}), and for the spring *RE* (from 1.00 to 0.01 MJ·mm·ha^{-1}·h^{-1}) and *ED* (from 0.04 to 0.01 MJ·ha^{-1}·h^{-1}), can be explained by the influence of the large-scale processes of climate variability, with North Atlantic Oscillation (NAO) being the most prominent.

CONCLUSION

Results of this study contribute to growing evidence of erosion risk in SE Europe and have scope for further refinements.

The observed increase can lead to a higher erosive class, thus raising concerns for this type of hydro-meteorological hazard.

By identifying seasons and locations of the greatest erosion risk, this study can serve as the starting point for implementation the suitable mitigation measures on a local and regional scale.



Acknowledgments

This research was supported by the H2020 WIDESPREAD-05-2020—Twinning: ExtremeClimTwin that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952384.