

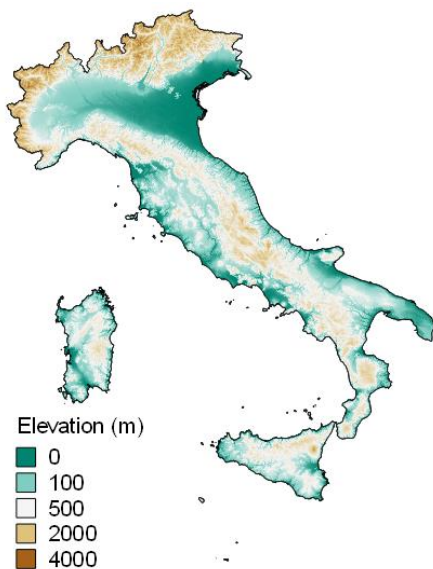
THE ISSUE

Spatial variability of rainfall is highly dependent on reliefs and geomorphology.

Steep slopes are likely to trigger intense precipitation events, especially if located near the coastline.

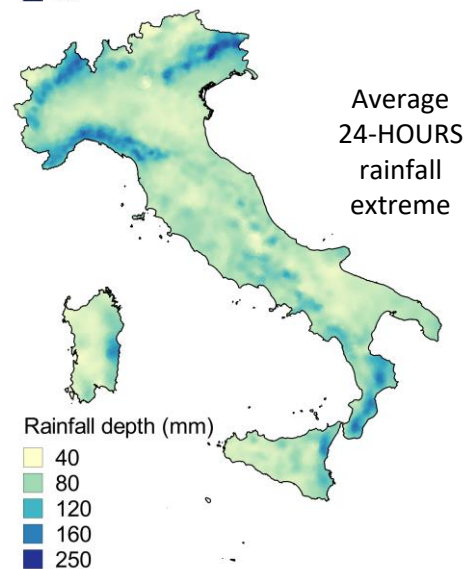
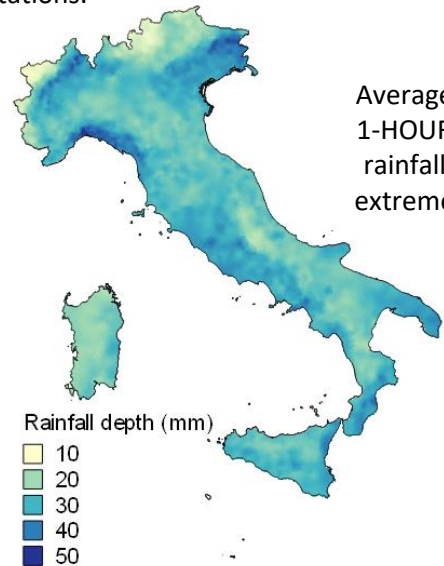
Rainfall extremes all over Italy present strong variability and have not been much investigated.

OROGRAPHY OF ITALY



I²-RED RAINFALL EXTREMES

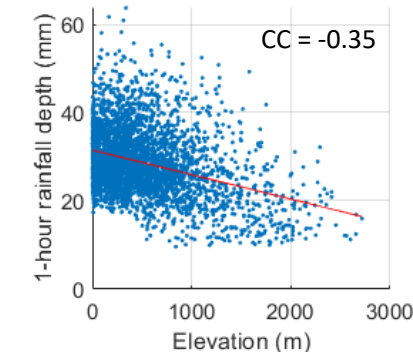
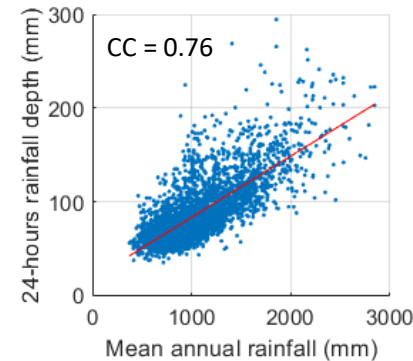
Rainfall data (1916 - 2019) from > 3700 stations.



LINEAR REGRESSIONS

Variables:

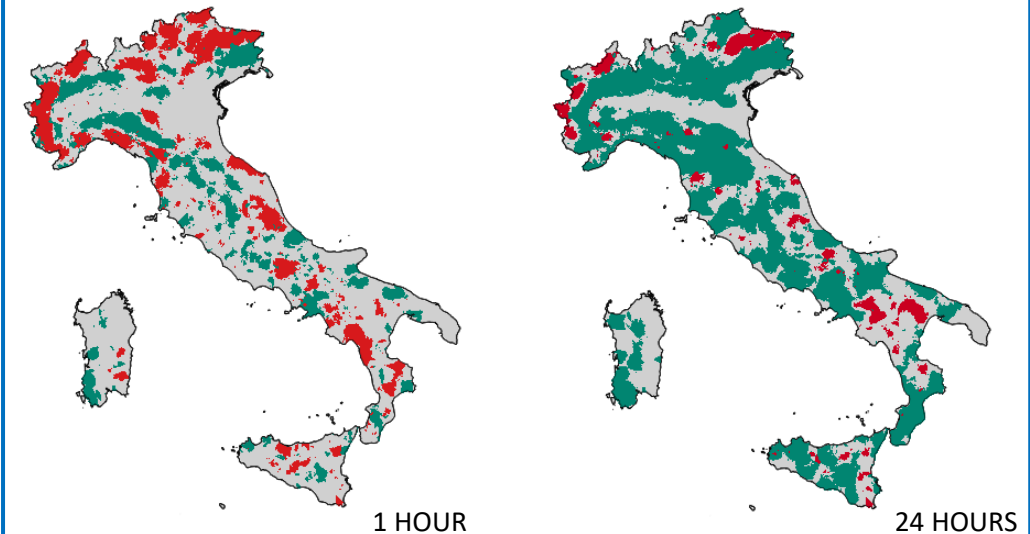
- latitude;
- longitude;
- elevation;
- distance from the coastline;
- slope;
- openness;
- obstruction parameters;
- mean annual rainfall.



LOCAL LINEAR REGRESSIONS

Distributed relationships have been fitted in circles centered on any of the 0.5-km size pixels, with 1 to 30 km radius and at least 5 stations included.

- Mean rainfall depth increases with the elevation
- Mean rainfall depth decreases with the elevation
- Not statistically significant trend (5% level)



CONCLUSIONS

- Significant influence of the mean annual rainfall on the spatial variability and intensity of sub-daily rainfall extremes.
- The sign of the relationship between elevation and 1-hour rainfall depths varies across Italy, except for the Alps (general decrease of rainfall depths with the elevation).
- 24-hours rainfall depths generally increase with the elevation.

REFERENCE

Mazzoglio, P.; Butera, I.; Claps, P. I²-RED: A Massive Update and Quality Control of the Italian Annual Extreme Rainfall Dataset. *Water* 2020, 12, 3308.