

Influence of morphology on the spatial variability of rainstorms over Italy

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IMPROVED ITALIAN – RAINFALL EXTREME DATASET (I²-RED)

Short-duration (1, 3, 6, 12 and 24 hours)
annual maximum rainfall depths

> 5200 rain gauges

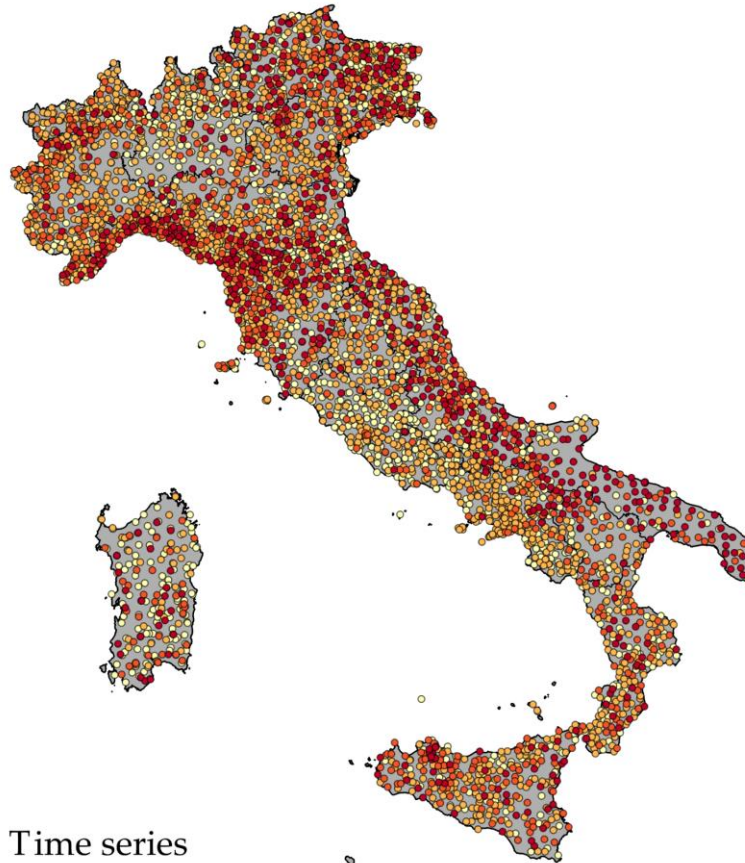
Period: 1916 – today



Evaluation of the mean rainfall depth
(index rainfall)
at each station location.

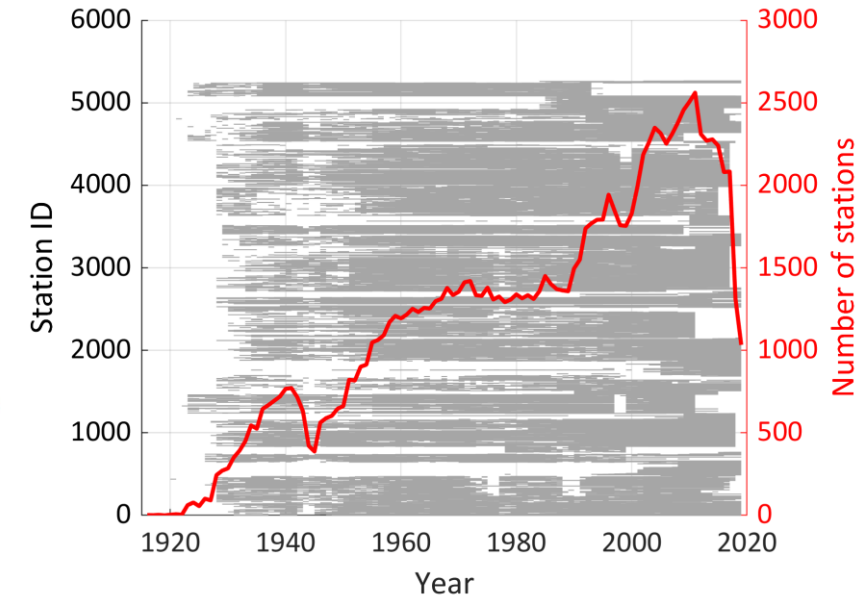


Focus on 1- and 24-hour durations.

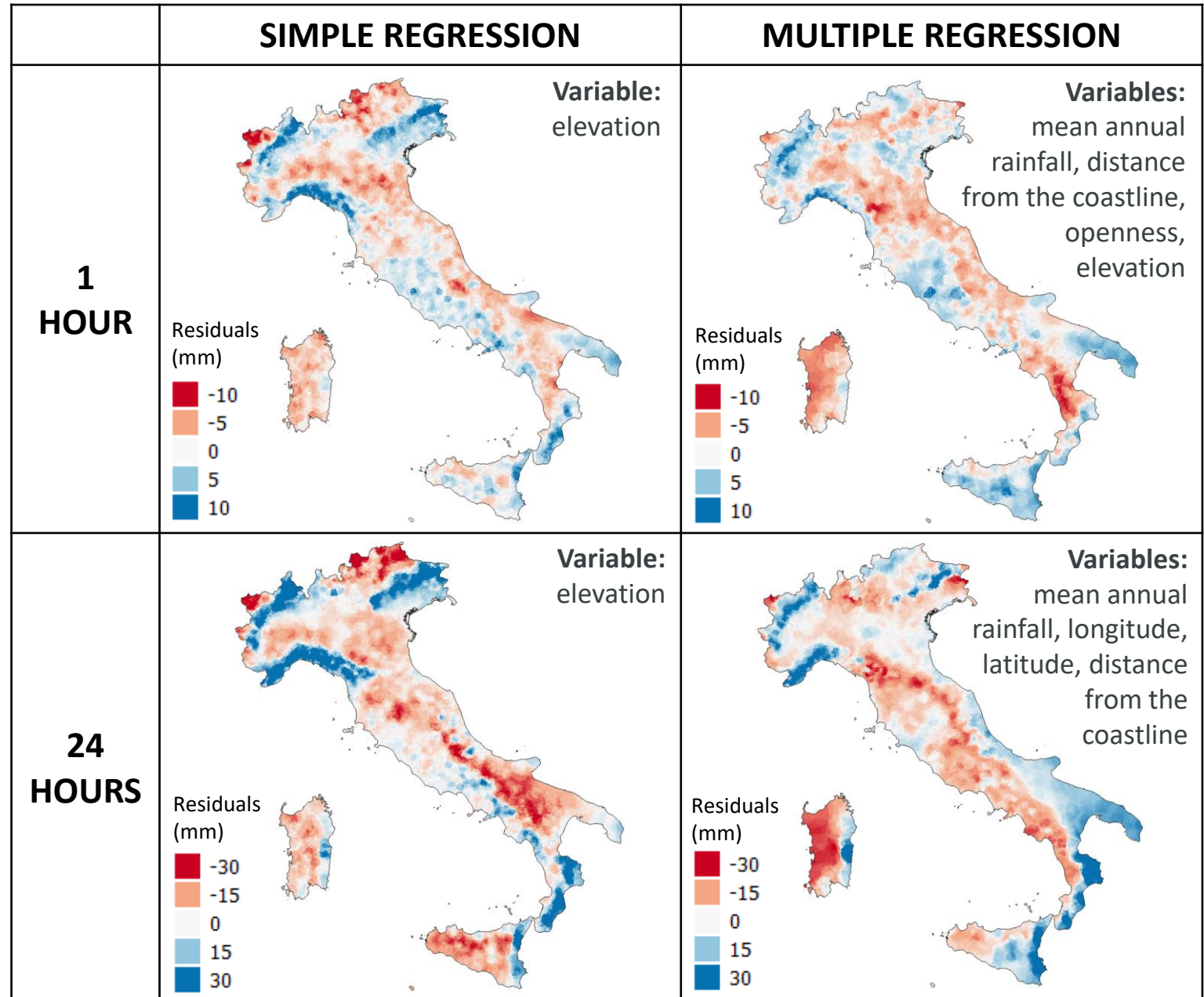
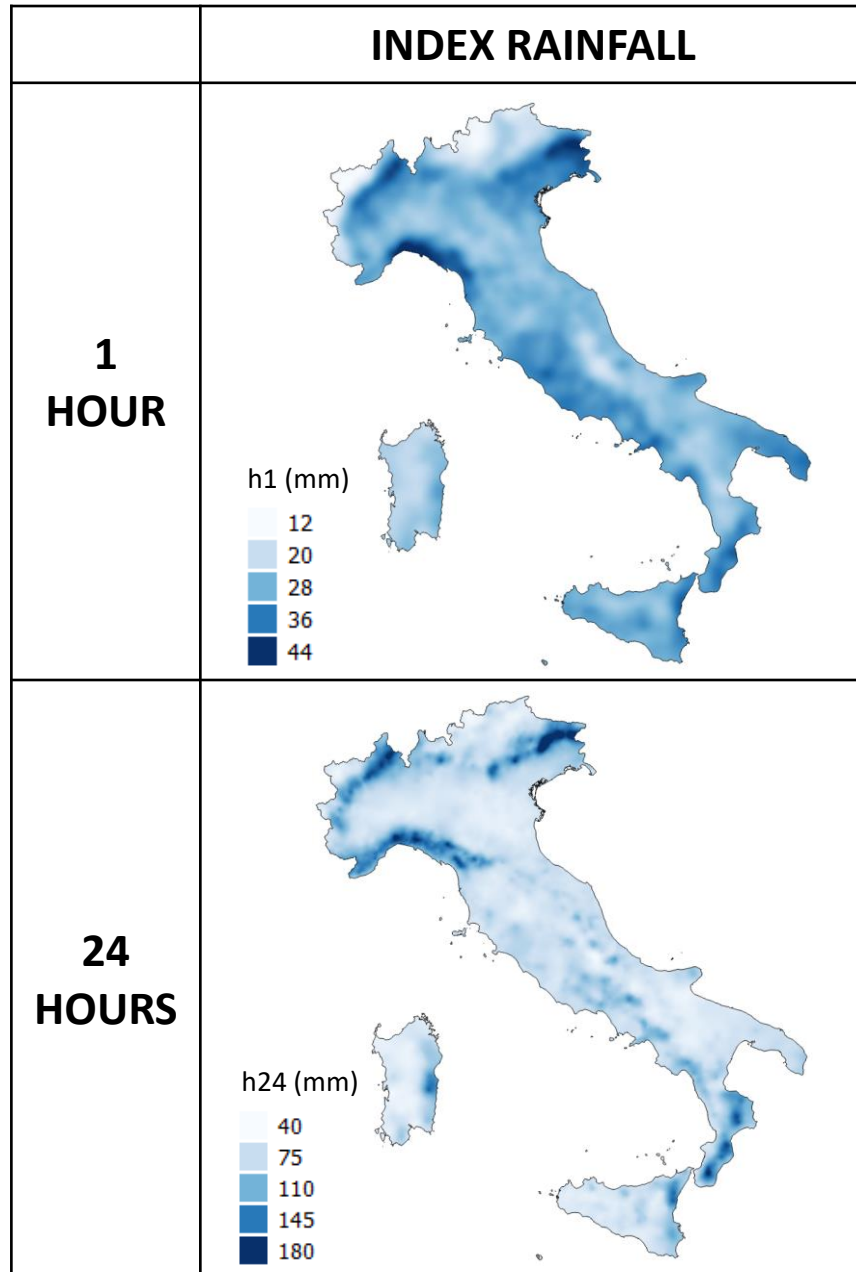


Time series

- 1 - 10 years
- 10 - 30 years
- 30 - 50 years
- 50 - 90 years



SIMPLE AND MULTIPLE LINEAR REGRESSIONS: NATIONAL-SCALE APPROACH

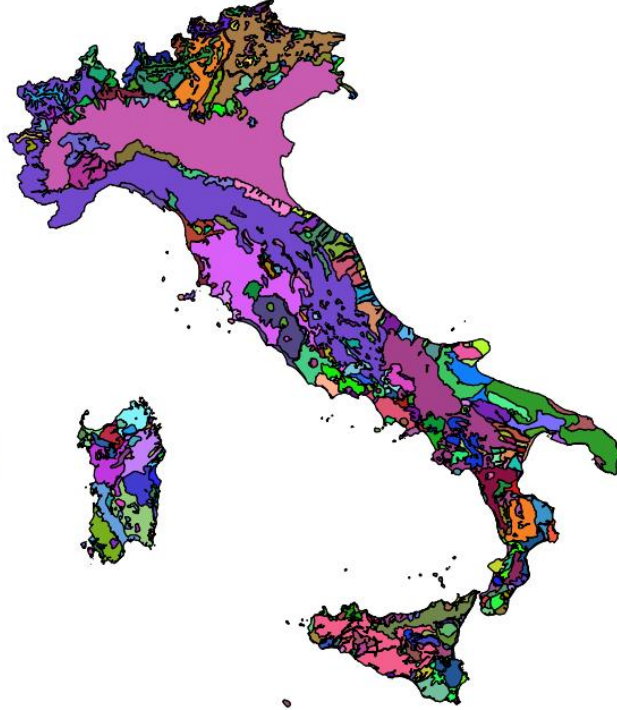


GEOMORPHOLOGICAL REGIONS



IWAHASHI AND PIKE
(2007)

Variables: slope gradient,
local convexity
and surface texture



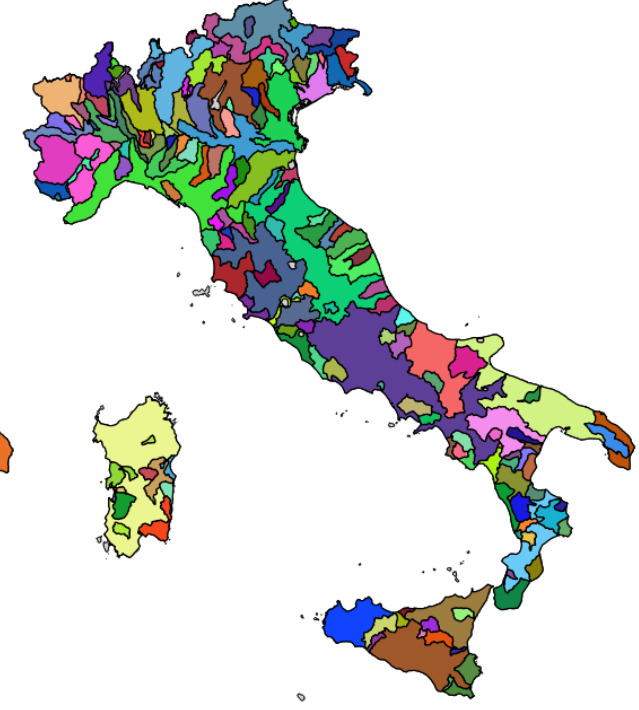
CARTA DELLA NATURA
- MAP OF NATURE -
(2003)

Variables: land cover and
morphological - lithological
characteristics



GUZZETTI AND REICHENBACH
(1994)

Variables: altitude derivatives
combined with structural,
morphometric and geological
maps



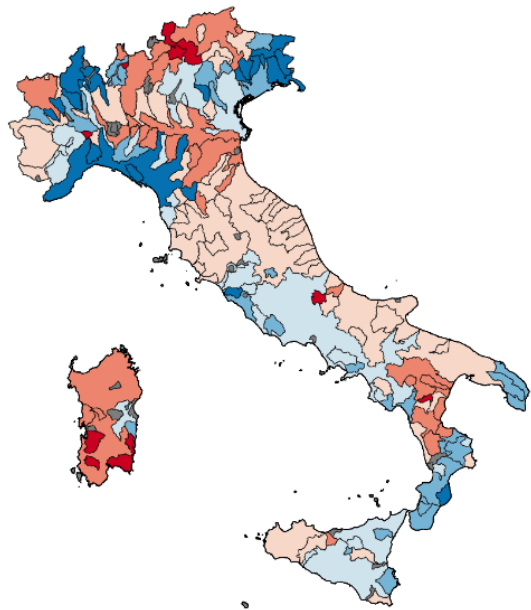
ALVIOLI ET AL.
(2020)

Cluster of slope units (terrain
partitions delimited by
drainage and divide lines)

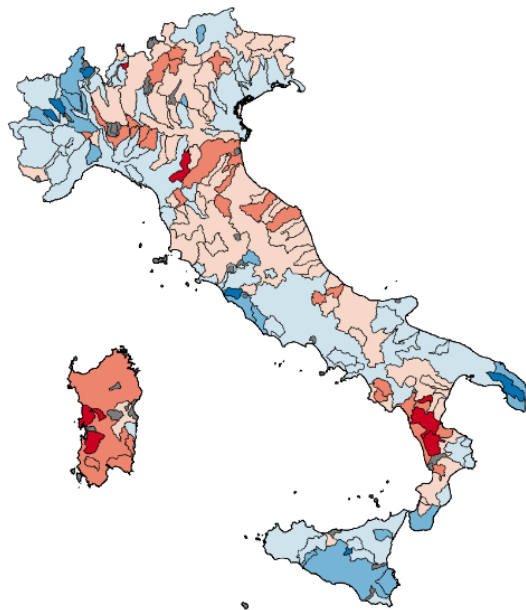
SIMPLE LINEAR REGRESSION OVER GEOMORPHOLOGICAL DOMAINS

Geomorphological classification of Alvioli et al. (2020)

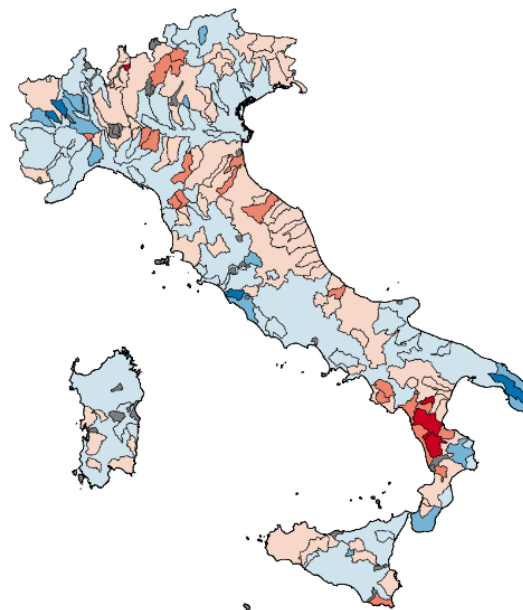
NATIONAL-SCALE
SIMPLE
REGRESSION
MODEL



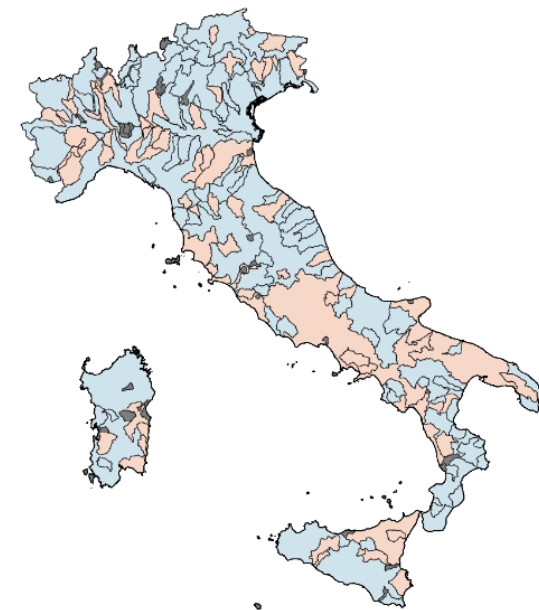
NATIONAL-SCALE
MULTIPLE
REGRESSION
MODEL



FOUR-REGION
MULTIPLE
REGRESSION
MODEL



SIMPLE REGRESSION
MODEL OVER
GEOMORPHOLOGICAL
CLASSIFICATIONS



Bias (mm)



SIMPLE LINEAR REGRESSION OVER GEOMORPHOLOGICAL DOMAINS

Geomorphological classification of Alvioli et al. (2020)

