

Evaluating the effectiveness of risk reduction strategies

Understanding natural hazard risk management in Italy

EXTreme RAInfall and FLOOD projections over Italy EXTRAFLOOD

QUESTION How can flood hazard and risk assessment be improved to include potential impacts from climate change?

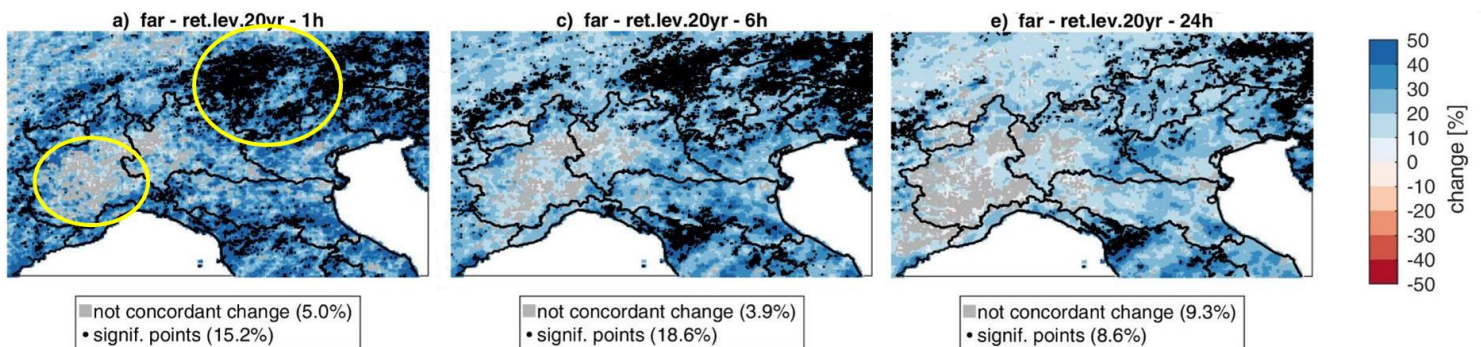
OBJECTIVE This work aims to develop an integrated methodology to assess the impact of climate change on intense precipitation and flood hazard in Italy, leveraging high-resolution, next-generation climate models.

DESCRIPTION EXTRAFLOOD builds upon the recent availability of next-generation, high-resolution climate models capable of explicitly representing the convective processes responsible for intense precipitation. Additionally, it leverages innovative statistical methodologies to assess the impact of climate change on extreme precipitation, flash floods, and debris flows in Italy.

HOW IT WORKS With EXTRAFLOOD, next-generation climate models with high spatial and temporal resolution are analyzed using innovative statistical methods to quantify the impact of climate change on variations in the frequency and intensity of key hydrometeorological extremes through the end of the century. These extremes include:

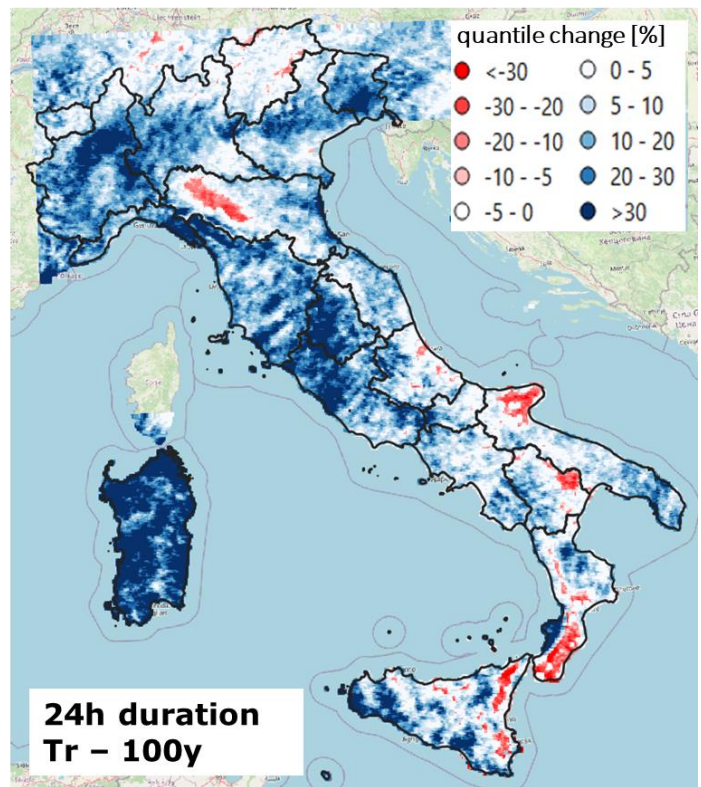
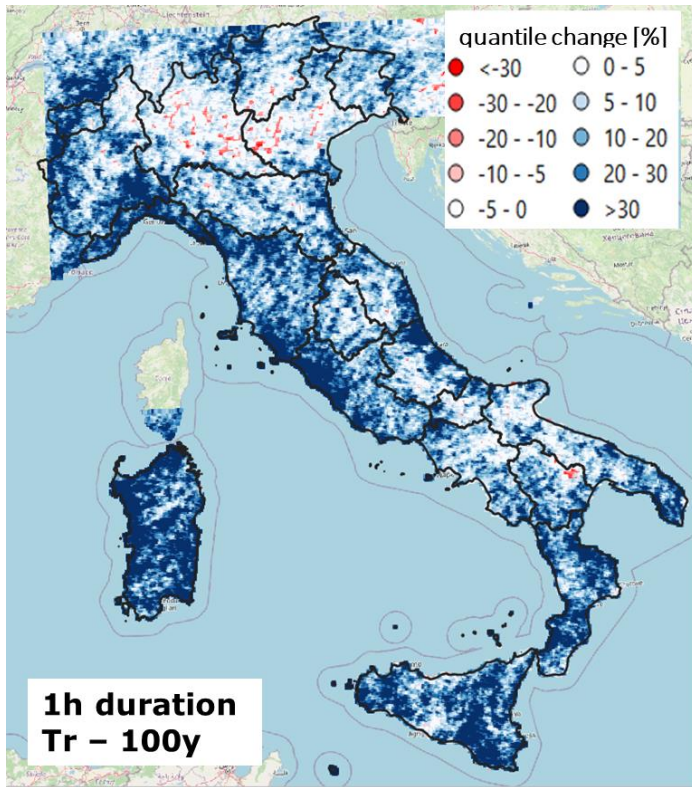
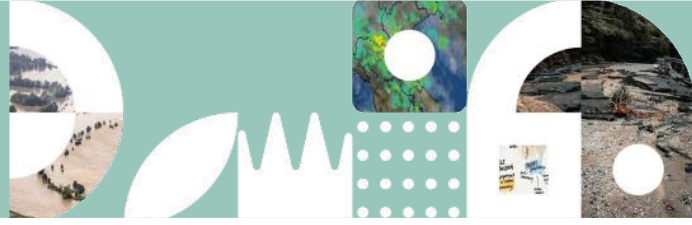
- extreme precipitation;
- flash floods;
- debris flows.

Variations in extreme precipitation are described and mapped continuously across the entire national territory, with a temporal resolution of one hour and a spatial resolution of 2 km. Impact assessments for flash floods and debris flows are conducted in six study areas, selected along a climatic transect that represents the hydroclimatic variability of Italy, based on the availability of detailed observations of relevant hydrological processes. The project is carried out in collaboration with local authorities and includes community engagement events to raise public awareness on flood risks—issues that are increasingly central to the sustainable socio-economic development of our regions over the course of this century.



Future changes (2090-99 vs 1996-2005) on extreme precipitation: an ensemble-based approach to climate models





Changes in precipitation quantiles (2070 with respect to 1981)

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Institutions



“ Impact-based decision making allows the prioritization of strategies for targeted future investments.”

