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High resolution hydrological simulations show climate change increases flood hazard proxies over Italy

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While future climate simulations with Regional Climate models are becoming increasingly common, there is increased interest about the effects of climate change on the hydrological cycle at small spatial scales.
We present a new hydrological RCP8.5 scenario simulation over Italy using the high resolution CHyM model, driven by the RegCM Regional Climate Model at 12km. The simulation spans the period 1976-2100, with a resolution ranging from 300 to 900m (depending on the region). Future changes both in terms of mean and extreme discharges under the RCP8.5 climate scenario are presented and discussed.
Average discharges show a shift towards increased fall and winter flows by the end of the century, especially for the northern regions fed by the Alpine mountain range. The patterns follow changes in the average precipitation provided by the driving RCM.
Several flood proxy metrics are analysed, including mean annual peak discharge, peak over threshold events and 100-year return period projected flow (Q100).
In particular, the Q100 metric shows a strong increase in future extreme discharge, on average doubling the intensity of such events by the end of the century. Extreme flow changes are uniform across most of the Italian territory, but are particularly marked over the eastern coast of central Italy, where Q100 change values can exceed +200%.