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Analysing the problems involved in assessing hydro-meteorological triggers.

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A key component in risk assessments is quantifying the probability of occurrence and the intensity of the hazards, which will alter with climate change. However, before future changes in these hazards can be determined, the current relationship between the hazard and the meteorological trigger should be understood. It is known that intense short duration precipitation, long-lasting rainfall and snow-melt are all important for mountainous areas in Europe, yet determining the precise triggers and their temporal probability faces many challenges. While long records are necessary to capture natural variations in the climate and a number of hazard occurrences, long records are often incomplete and not homogeneous. There is also often a spatial mismatch between climate observations and the meteorological mechanism which is actually triggering a flood or a landslide. Furthermore, meteorological triggers do not act alone – land cover and use, engineering works and changes in the slope conditions can all influence the probability of occurrence.

The objective of this work is to explore the current challenges faced when trying to determine the temporal probability of hydro-meteorological triggers as well as potential solutions to the challenges identified. Examples are drawn from floods and landslides observed in the Ubaye Valley (France) and in the Fella River Basin (Italy), focusing on how data availability and quality, conceptualization of the problem and different statistically based approaches all alter the temporal probability of hydro-meteorological triggers. With a better understanding of the underlying uncertainties in meteorological triggering conditions for hydro-meteorological hazards, this will hopefully lead to a better understanding and quantification of hydro-meteorological hazards for risk assessment, for now and future projections.

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