

# Temperature effects on the spatial structure of heavy rainfall and its impacts on the hydrology

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Heavy rainfall is expected to intensify at a  $7\% \text{ }^\circ\text{C}^{-1}$  rate according to the well-known Clausius-Clapeyron relation. Warmer temperature affects not only the peak rainfall intensity but also the space-time properties of storms, which can amplify or weaken the impacts on the hydrology and geomorphology.

The talk will focus on the analysis of heavy rainfall at the storm and convective rain cell scales using high space-time resolution rainfall estimates from weather radars (1-km, 5-min), climate reanalysis products and climate models. Observations show that the spatial properties of the storms and peak rainfall intensities follow a different scaling relation with temperature for different locations worldwide. Using numerical experiments, the sensitivity of floods in urban areas and rural catchments and the sensitivity of the landscape response to changes in the rainfall spatial structure at the small-scale were examined. The potential effect of climate change on rainfall intensification, changes to the space-time structure of rainfall and the impacts on the hydro-morphological response will be discussed.