Synoptic weather persistence and landslides in the Emilia-Romagna region, Italy

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Landslides represent a major hazard in montane environments, and predicting these can reduce the impact of events. Currently, rainfall thresholds are used to predict landslide occurrence, but these may become less reliable under a changing climate.

Synoptic weather patterns have been shown to be highly correlated with landslide occurrence (Wood et al., 2013, 2016, 2018). Here we use an extensive dataset of rainfall-triggered landslides for the Emilia-Romagna, Italy (Berti et al., 2012) to understand the influence of synoptic weather persistence on the initiation of landslides in the region.

We use Brier Skill scores to select appropriate synoptic weather classifications from a catalogue, and then apply Monte Carlo Permutation tests to ascertain which synoptic weather types are more (or less) likely to trigger landslides. We additionally look at the persistence of different weather types prior to landslide initiation, and bring this into context with existing rainfall thresholds for the region. We hope that this will help to contextualise previous research into the use of synoptic weather types for landslide predictions under a changing climate.