Trigger atmospheric conditions for RIL in the Southern Andes.

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Rainfall-Induced Landslides (RIL) are one of the most important natural hazards due to their damage to populated areas, critical infrastructure, and roads. Therefore, their deep understanding is critical for decision-makers. The Southern Andes (~ 41.1°S, 72.5°W) has undergone recurring RIL processes in recent years, which have affected interurban connectivity with strong social impacts. The objective of this study is to understand the atmospheric conditions that could trigger RIL at the Southern Andes. We propose a correction of high-resolution atmospheric simulations based on the Weather and Research Forecast (WRF) model. Our results were corrected by meteorological in-situ stations using geostatistical techniques. We identify precursor signals at different pressure heights that could be used to the future in an early warning system. Our proposed methodology will support the generation of public policies in the context of climate change scenarios in catchments with low-dense instrumentation and low uncertainty. Hence, our database will provide new hydrometeorological perspectives in RIL studies. To the future, these results will allow the development of an early warning system applicable in the central-southern zone of Chile.