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MODELING LANDSLIDE ACTIVITY AND SEDIMENT CONNECTIVITY AFTER ERUPTIONS: INSIGHTS FROM THE BLANCO RIVER (CHILE)

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Volcanic eruptions can disrupt entire river basins by affecting the hydro-geomorphic characteristics of channel networks and hillslopes. Reports suggest a pulsed and delayed increase in landslide activity following the eruptions, which, depending on the degree of connectivity between hillslopes and channels can represent a massive source of sediment input for the fluvial system. Therefore, predicting landslide occurrence and sediment connectivity is fundamental for management risk strategies, especially in such dynamic and complex environments. The aim of this work is to develop and offer a more reliable approach to map the areas susceptible to landslides and connected to the active channel in a catchment impacted by volcanic eruption. The analyses were carried out in the Blanco River catchment, affected by the Chaitén eruption (2008-09). A combined approach is presented, based on landslide susceptibility models and a threshold-based sediment connectivity map. The results showed that the highest landslide occurrence was reported 4 years after the eruption. Landslide susceptibility models showed high accuracy when applied in the same year but were less accurate in predicting future occurrences. This result is ascribed to the dynamic conditions of the vegetation, regenerating quickly after the mass movements. The combined landslide susceptibility-connectivity map well-identified relevant areas for catchment management. The majority of the catchment was found non-susceptible and disconnected, while areas classified as susceptible and connected represents only the 3.1%. The application of this approach unraveled the geomorphic trajectory of the study area and represent a benchmark for future applications in other catchments affected by large disturbances.