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Limited to null erosive response to the Mw 8.8 Maule Earthquake derived from variations in the sediment concentration of the rivers

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We address the question whether all large magnitude earthquakes produce an erosion peak, particularly the case of inter-plate seismicity. We analyze the surface response of the Maule Earthquake (Mw 8.8, February 27th, 2010, Chile) in terms of catchment erosion using suspended sediment record in 33 gauges located along the rupture zone. The studied catchments are large (∼350-24000 km2) and spread along different slopes, climatic setting and percent of vegetation cover of the Andean Western Flank. We contrast the pre- and post-seismic dynamic of sediment exportation in terms of mean suspended sediment flux; mean suspended sediment concentration; mean water discharge, and suspended sediments rating parameters. When comparing results between the 25-years-long pre-quake period and the 3-years-long post-quake period, we do not observe a significant increase in the suspended sediment concentration nor in the suspended sediment fluxes in most of the analyzed catchments. Our results are consistent with a small record of mass wasting triggered by the Maule Earthquake. The co-seismic low erosive response may be a consequence of the moderate slope, high vegetation cover and high rock strength of the nearest mountain range to the rupture area. The low record of slope failures can be also a consequence of the low amount of water in soils due the date of the earthquake, at the end of the dry season. In other hand, the drought affecting the rupture zone since 2010 means a reduced sediment connectivity during the post-seismic period. Our results suggest that earthquake magnitude is not a good predictor of erosion by itself, highlighting the role of climate.