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Potential use of river suspended-sediment observations to evaluate the effects of seismic shaking on sediment yield

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It has been empirically proved that large earthquakes (M>6) trigger landslides and shattering of landscapes, which increase the sediment yield in drainage basins and hence sediment delivery to the rivers. Besides the historical records reporting eyewitness accounts of muddy rivers after earthquakes, this phenomenon was also supported by quantitative analyses on the suspended sediment load of rivers before and after the Chi-Chi Earthquake (Mw=7.6) in 1999 in Taiwan. Observations and understanding of this phenomenon is crucial to trace the sedimentological fingerprints of paleoearthquakes in marine and lacustrine sedimentary sequences. This study presents the evaluation of the publicly available river discharge and suspended-sediment concentration measurements to assess the possible effects of earthquakes on sediment yields in Turkey. For this purpose, measurements from 10 hydrometric stations are utilized, which are located near the epicentres of the 1998 Adana-Ceyhan Earthquake (Mw=6.2), the 1999 İzmit Earthquake (Mw=7.4) and the 1999 Düzce Earthquake (Mw=7.2). The dataset contains ca. 1600 measurements between 1991 and 2005. At only a few stations, anomalies in sediment concentration are observed immediately after the earthquakes. On the other hand, at most of the stations, the data through longer periods after the earthquakes (3-4 years) reveal slight increases in sediment concentration. The low temporal resolution of the measurements (every 20-30 days) limits the observation of possible sudden increase in sediment concentration immediately after the earthquakes. According to the preliminary results, sediment yield seems to be affected from seismic shaking. However, for more robust results, longer-term measurements with higher temporal resolution are required. The future study will focus on a quantitative evaluation and modelling on expected sediment yield after seismic shaking.