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Tectonic activity of the Eastern Central Range front in Taiwan: Perspective from in situ cosmogenic 10Be

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In Eastern Taiwan, most of the active tectonic studies developed during the last decade focused on the Longitudinal Valley Fault, which borders the western side of the Coastal Range and represents the boundary between Eurasia and Philippine Sea Plate. On the other side of the Longitudinal Valley, the degree of tectonic activity characterizing the eastern flank of the Central Range is still pretty much unknown. Analysis of tectonically active landscapes requires quantification of topographical characteristics, together with documentation of rates of bedrock uplift and geomorphic processes. In this study, we applied a regional geomorphic analysis combined to the measurement of in situ-produced cosmogenic 10Be concentrations in (1) bedrock outcrops associated to preserved paleo-river beds along the Lu-Ming river, and (2) in fluvial sediments sampled at the outlets of selected watersheds. Our preliminary results indicate that the integrated basin-wide denudation rates are on the order of 3 to 5 mm/yr, ten times lower than the vertical rate of incision one can derived from the bedrock exposures. Through this study, we would like to emphasis that not only do cosmogenic exposure techniques allow placing constraints on important geomorphic processes, such as rates of river incision or hillslope erosion, characterizing the landscape evolution of the Taiwanese mountains, but also allow opening the observation time window of towards time scales that are longuer than those characterizing the geodetic techniques commonly used in this region.