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Quaternary downcutting rates from cave-deposited river sediment and Holocene erosion rates from river sand in the Central Pyrenees

Philippe Vernant (1), Manon Genti (1), Jean Chéry (1), Gaël Cazes (2,3), and Régis Braucher (4)

(1) Université Montpellier, Geosciences Montpellier, Montpellier, France, (2) School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia, (3) Institute for Environmental Research, Australian Nuclear Science and Technology Organisation, Lucas Heights, Australia, (4) CEREGE, LN2C, Aix en Provence, France

We use ^{26}Al and ^{10}Be to infer the time of cave-deposited river sediment emplacement in the Central Pyrenees and the Cevennes. Using these ages, we derive mid-term downcutting rates (1-4.10^6 a). We also use the cosmogenic radionuclides ^{10}Be concentration in quartz extracted from river sand to estimate short-term (10^2–10^5 a) erosion rates. Along the N-S profile across the central Pyrenees, we do not see any significant change in erosion rates during the Quaternary. On the other hand, the erosion rates are highly correlated with the local elevation. They vary roughly from 50 m/Myr in the foreland up to 800 m/Myr in the axial part of the mountain range. The mechanisms responsible for the Pyrenees moderate, but frequent, seismicity have yet to be determined. Based on numerical modeling and our erosion rates, we propose that this seismicity could be explained by the isostatic rebound associated to the erosion of the range. To evaluate the likeliness of this hypothesis, we aim at comparing the Pyrenees and the Cevennes to check if the rates are significantly different between these mountain ranges with very different seismic behavior.