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Measuring ^{10}Be concentrations in stream sediments from the Vosges Mountains (NE France) to explore the respective role of lithologic, topographic and climatic control on massif-wide denudation

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The Vosges Mountains in NE France belong to the belt of Variscan massifs located in the foreland of the Alps. This range of low mountains peaking at ~1425 m presents three contrasting primary characteristics. Firstly, a bipartite N-S subdivision based on the geological basement: the southern part (crystalline Vosges) composed of Palaeozoic, metamorphic and sedimentary rocks and the northern part (sandstone Vosges) being much more homogeneous given its Triassic sandstone cover. Secondly, a clear E-W topographic gradient characterised by steep hillslopes (up to 800m) on the eastern side (Alsace) in contrast to gently-sloping hillslopes with a longer extension on the western side (Lorraine). Finally, the imprint left by Quaternary climatic fluctuations yielded a N-S gradient: whereas the crystalline Vosges hosted abundant valley glaciers and still bears traces of significant glacial erosion, the sandstone Vosges was void of ice cover.

In spite of these advantageous characteristics, very little is known about the Quaternary evolution of the massif, in particular regarding the long-term interactions between denudation, lithological control, climatic forcing and tectonic activity. Against this background, this contribution aims to present the first data of long-term, massif-wide denudation. Modern stream sediments from 21 river catchments draining the whole massif were sampled for *in situ* ^{10}Be concentration measurements at the outlet of their mountainous reach. Catchment-wide denudation rates inferred from cosmogenic ^{10}Be will be combined with the analysis of morphometric parameters and structural connectivity resulting from the processing of a DEM. According to the three contrasting characteristics (lithology, topography and glacial cover), we thus test the main hypothesis that the four NE, NW, SE, SW quarters of the Vosges massif shall be characterised by contrasting denudation rates, reflecting the respective role played by the controlling factors on long-term denudation. To our knowledge, this contribution is the first attempt to quantify denudation at the massif scale of a European low mountain range. This is especially relevant as long-term landscape evolution in the Variscan belt, by contrast to the numerous works focusing on denudation in high-mountains ranges (e.g. the Alps), has been regularly disregarded in recent geomorphological studies.

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