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Detrital thermochronology records changing source areas and steady exhumation in the Western European Alps

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A dramatic increase in sediment flux since ∼5 Ma has been inferred for the European Alps and worldwide, which is interpreted to reflect a climatically driven increase in erosion rates. However, detrital thermochronology data from the Alpine forelands suggest steady Miocene-Pliocene exhumation, contradicting the sediment budget data. We present new detrital apatite fission-track (AFT) data from the foreland of the Western Alps to better resolve Miocene to present-day exhumation rates and to determine sediment provenance. A shift in AFT lag time from <3 m.y. before 13 Ma to ∼6 m.y. from 10 Ma on reflects reorganization of the drainage pattern within the Alps. AFT lag times are constant since then. Thermal modeling reveals that our detrital AFT dataset is sufficiently sensitive to detect an increase in erosion rate, but our data record overall steady exhumation of the Western Alps since 10 Ma. Hence, increasing climatically controlled erosion may have been balanced by decreasing tectonic activity since ∼5 Ma.