



Origin of the highly elevated, dissected Pyrenean peneplain

J. Babault (1), J. Van Den Driessche (1), S. Bonnet (1), S. Castelltort (2) and A. Crave (1)

(1) Géoscience Rennes, UMR 6118, Université de Rennes 1, (2) Department of Earth Sciences, ETH-Zentrum, Sonneggstrasse 5, CH-8092 Zürich, Switzerland
(julien.babault@univ-rennes1.fr)

Peneplanation of mountain ranges is generally considered as resulting from long term erosional processes that smoothes relief and lowers elevation near sea-level. Therefore peneplain remnants at high elevation in mountain ranges are used to infer post-tectonic surface uplift. Such an interpretation has been proposed for the Pyrenees where high elevation, low relief erosional surfaces rose up to more than 2000 m. Because the Pyrenean foreland basins are filled with very thick continental deposits, which have buried the early jagged landscape, we challenge this hypothesis by pointing out that relief applanation does not necessarily require elevation lowering. We propose an alternative interpretation in which piedmont aggradation of detrital sediment that comes from erosion of the high chain induces the rise of the base-level of the range, therefore reducing strongly the erosive efficiency of the drainage system and resulting in the progressive smoothing of the relief. Such a process allows a high-elevation, low-relief erosional surface to develop at the scale of the range. In the Pyrenees, occurrence of high-elevation, low-relief erosional surface remnants does not imply a post-tectonic uplift, but is instead due to the dissection of the initial Miocene high-elevation, low-relief surface by the recent drainage system, the erosive activity of which has been enhanced by global climate change from the Late Pliocene onward.