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Estimation of Pleistocene erosion rates based on basin volume reconstruction (Guadix-Baza basin, SE Spain)

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Erosion rates in the Guadix-Baza basin have been calculated drawing on a volumetric estimation of sediment loss by river erosion since the late Pleistocene. On this purpose we have performed a reconstruction of the geometrical surface dated in 43 Ka and defined by a calcrete layer that capes the basin infilling. In order to carry out this basin reconstruction we used a Digital Elevation Model of 10 meters of pixel resolution. By comparing the reconstructed geomorphic surface and the present day topography we have calculated the volume of sediment lost by hidric erosion in the entire basin. The resulting erosion rate is 6.57 m^3ha-1yr^{-1}. This high erosion rate can not be explained only by means of a process of river capture but also by a Pleistocene tectonic uplift in the basin. Individual erosion rates for Guadix and Baza sub-basins (11.80 m^3ha-1$yr^{-1}$and 1.77 m^3ha-1yr^{-1} respectively) suggest different stages of drainage pattern evolution in both sub-basins. We attribute the lower values obtained in the Baza sub-basin as related partially to the downthrowing of this sub-basin due to very recent activity along the Baza fault.