

## Spatial patterns of erosion and landscape evolution in the central Menderes Massif (Western Turkey) revealed by cosmogenic $^{10}\text{Be}$

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In regions undergoing active crustal shortening, rock exhumation occurs exclusively by erosion, whereas in extensional tectonic settings rocks are exhumed by both erosion and normal faulting (e.g. Ring et al., 1999). An ideal region to study the relative contribution of normal faulting vs. erosion to rock exhumation is the central Menderes Massif in Western Turkey, which is bounded by the low-angle Gediz and Büyük Menderes detachment faults (e.g. Gessner et al., 2013). Recent thermochronological data show that the two detachments faults were active contemporaneously during the Pliocene (Buscher et al., 2013; Wölfler et al., in revision). Here we present  $^{10}\text{Be}$  erosion rates for 37 catchments to resolve the spatial pattern of erosion across the central Menderes Massif. Our results show that erosion rates for catchments located in the footwall of the Gediz detachment range from 40 to 150 mm/kyr. These relatively low rates indicate that the thick (20-50 m) cataclasites associated with this detachment fault have protected the footwall from significant erosion, which explains why the Gediz detachment is such an outstanding geomorphic feature. A comparison with thermochronological data (Buscher et al., 2013) shows that erosion contributed 10-20% to rock exhumation (0.6-2.0 km/Myr). In contrast, erosion rates from catchments in the footwall of the Büyük Menderes detachment are generally higher, with rates ranging from 140 to 400 mm/kyr. These higher rates are consistent with the observation that the respective catchments expose mechanically weak mica schists and phyllites and have rather steep hillslopes. Together with the fact that the Büyük Menderes detachment is associated with only a relatively thin layer of fault gouge and cataclasite, this explains why the Büyük Menderes detachment is less well preserved than the Gediz detachment despite the contemporaneous activity of both detachments. Furthermore, our data show that erosion contributed 20-40% to the total exhumation rate of  $\sim 1$  km/Myr in the footwall of the Büyük Menderes detachment (Wölfler et al, in revision). Our results imply that normal faulting played the dominant role for rock exhumation at both detachments but that the relative contribution of erosion is higher at the Büyük Menderes detachment than at the Gediz detachment.

### References

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