



Why is Deosai so high (and flat)?

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Mountain ranges of the north-western Himalaya in Pakistan show strongly contrasting relief, opposing steep, deeply incised topography with extremely high peaks such as the Karakorum Range and Nanga Parbat Haramosh Massif (NPHM), to high-altitude, low-relief areas such as the Deosai Plateau between the Karakorum and NPHM, as well as the Ladakh range in northern India. In contrast, mean elevations of the different mountain ranges are comparable, the Deosai Plateau being on average even slightly higher than the adjacent NPHM. The aim of this study is to quantify the exhumation history and morphology of the Deosai Plateau, in order to understand how to build such a high-altitude, low-relief plateau and how to preserve it over million-year timescales.

Here, we report the first apatite fission-track (AFT) data from the Deosai Plateau, which allow comparing its late-stage exhumation history to that of the surrounding massifs. Ar/Ar biotite ages in NPHM and Karakorum show a range between <1 and 10 Ma and AFT ages from these massifs are very young: < 1 Ma for NPHM and between <1 and 7 Ma in Karakorum. In contrast, our preliminary AFT results from the Deosai Plateau show an age range between 10 and 20 Ma. A clear link with the morphology appears, with strongly incised, high-relief, massifs showing exhumation at rates an order of magnitude faster than the low-relief plateau. The morphological differences between the Deosai Plateau and surrounding massifs imply that erosion processes are not similar. Drainage of the NPHM is much better integrated than that of the Deosai Plateau. The NPHM is crossed by two major rivers; its drainage system is characterised by glaciers and high energy mountain streams. In contrast, drainage of the Deosai Plateau only has a single outlet to the south-east. Our study shows how the combination of thermochronological techniques and morphologic analyses may pro-

vide insights into the construction and evolution of high-altitude mountain plateaux. In particular, it addresses the question of the position of the Deosai Plateau within the Himalayan-Tibet System; can it be considered as a piece of Tibet isolated by recent Karakorum exhumation, west of the Karakorum fault?