



## **Styles of glaciation on Kilimanjaro, Tanzania, in response to late Quaternary climate change**

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The recognition of geomorphological evidence for more extensive ice masses in a number of areas near the equator provides a direct link to climate change in the tropics. Kilimanjaro in Tanzania consists of the highest elevations in Africa, and sets of moraines document that ice was significantly more extensive in the past. The most extensive moraines around Kibo, the highest peak, suggest that glaciers may have extended down to around 3800 m at the Last Glacial Maximum (LGM). A more recent set of moraines, at 4600-4800 m on the western side of the peak, document the maximum position that ice reached during the Little Ice Age (LIA). Both of these sets of moraines indicate significant recession has occurred throughout the late Quaternary, and particularly during the 20th century. Present-day ice is restricted to rapidly-receding glaciers and icefields on the uppermost flanks and summit of Kibo, between ~5000-5800 m. The area is therefore important for understanding the timing, magnitude and style of glacier response to changes in climate in the tropics in the late Quaternary. This research presents the results of new field and remotely-sensed mapping of moraines relating to the Late Pleistocene and LIA, providing greater detail on the glacial geomorphology of the area than in previous mapping. This allows an assessment of the styles of glaciation, and particularly the role of topography and aspect on influencing response to climate and patterns of glacier recession.