



Glacial chronology of the Bale Mountains in southern Ethiopia

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The Bale Mountains in southern Ethiopia represent the largest afro-alpine environment above 4,000 m on the African continent. Even though ice caps and outlet glaciers are absent in the southern Ethiopian highlands nowadays, typical landscape features (U-shaped valleys, cirques, moraines, erratic boulders, roche moutonnées etc.) as well as geomorphological phenomena (e.g. patterned grounds) indicate different phases of extensive glacial and periglacial activity in the Bale Mountains during the Pleistocene. Detailed knowledge of the glacial history and palaeo-climate in the region is still lacking, as it is for most of the high African mountains, except for Mt. Kenya, Kilimanjaro and Ruwenzori. Information on the timing and extent of the maximum glaciation in southern Ethiopia are contributing to a better understanding of the palaeo-climate and landscape evolution of the alpine environment. It serves as an important proxy for palaeo-ecologists and archeologists to answer the question of the “Mountain Exile Hypothesis Project”, whether humans already migrated to the more humid and meltwater-supplying mountains in East Africa during the late Pleistocene – a period when the lowlands were dry and probably uninhabitable. The extent of palaeo-glaciation(s) in southern Ethiopia is determined by extensive mapping of terminal and lateral moraines in the field as well as on high-resolution satellite imagery. Surface exposure dating is applied to 65 boulders from the Bale and Arsi Mountains to constrain the timing of different glacier advances.