



Processes and rates of rock fall and rock fragment redistribution in an amba landscape, Ethiopia

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Ambas are structurally determined stepped mountains of the Ethiopian highlands. This paper quantifies the annual rock fragment transport rate on the ambas' cliffs and scree slopes, analyses its controlling factors, and presents a conceptual model explaining rock fragment densities in these landscapes. In the May Zegzeg catchment (Dogu'a Tembien district, Tigray), rockfall and rock fragment movement by runoff and livestock trampling were monitored between 1998 and 2001. Rockfall from cliffs and rock fragment transport on debris slopes under rangeland, mainly by livestock trampling, appear to be important geomorphic processes. Yearly, along a 1500-m long section of the Amba Aradam sandstone cliff, at least 80 t of rock fall over a mean vertical distance of 24 m. Yearly unit rock fragment transport rates on scree slopes were 23.1 and 37.9 kg m⁻¹ y⁻¹. This process is virtually stopped as a consequence of the establishment of exclosures. The conceptual model shows that besides rockfall from cliffs and argillipedoturbation, all factors and processes of rock fragment redistribution in the study area are of anthropogenic origin.