



Dust accretion under stone pavements: A complementary environmental archive in arid environments

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Stone pavements are widespread surface covers in arid environments. They form predominantly by the trapping of aeolian dust, which trickles below the surficial clast layer, where it forms a continuous layer of fine-grained material with a prominent foamy structure: the vesicular horizon (A_v). Successive accretion of dust leads to a thickening of the aeolian mantle and detaches clasts from bedrock. Since this process is dependent on environmental conditions, stone pavement-covered accretionary sections can be used as palaeoenvironmental archive.

In the eastern Mojave Desert, correlation of six sediment sections on a 560 ka old basalt flow yield a standard section, comprising at least three distinct units of pulsed aeolian sediment input, interrupted by phases of stone pavement formation, their burial and subsequent pedogenetic alteration. Formation and subsequent burial of stone pavements requires lateral re-formation processes. Two such processes – clast drag by unconcentrated overland flow and clast creep by air release from the soil – are presented, along with their environmental boundary conditions. The different sedimentary units under stone pavements in the eastern Mojave Desert must be interpreted in the light of both, the prominent climatic changes during the Pleistocene/Holocene and the young drainage system in this region. Accretionary dust sections under stone pavements receive their sediment predominantly from modern playas. However, they typically start trapping sediment and thus environmental information when the lake level drops and the lacustrine archive ceases. Hence, they appear to be complementary archives with the potential to fill the stratigraphic gaps in lacustrine records.