Biogeomorphology at the micro-scale: biogeochemical weathering of rock surfaces in the cold and warm deserts

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Biogeochemical weathering of stable rock surfaces in warm and cold deserts is a notable biogeomorphological process, which contribute to mineralogical transformation of rock constituents and rock disaggregation. Endolithic microorganisms (mostly bacteria, fungi and lichens) play a major role in controlling the destabilization and rejuvenation of rock surfaces; but occasionally, biofilms can stabilize rock surfaces. In most of the cases, endolithic communities precipitates byproducts (e.g. oxalates) contributing to enhance discontinuity and promoting exfoliation and disaggregation. On the contrary, rock varnish can develop as an external crust protecting the underliying rock from erosion and dissolution. In this contribution, a number of case-studies of fossil and active examples of biogeochemical weathering from warm deserts of Africa and Arabian peninsula and from Antarctica are considered. The comprarison of evidence suggests a highly differentiate – and occasionally surprisingly – array of effects of endolithic communities on rock surfaces.