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GRANITE GEOMORPHOLOGY – IN SEARCH OF A UNIFYING THEME

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Granite geomorphology is perhaps the second most distinctive after karst, with a wide range of landforms at all spatial scales, from minor (e.g. weathering pits) to mega, of regional significance (e.g. mountain ridges composed of closely-spaced domes). And yet, an explicit interest in granite landscapes is considerably less than that in karst, despite an extensive occurrence of granites on all continents. Although several important concepts in geomorphology have been developed from studies in granite terrains, such as the origin of tors, inselbergs, or the general concept of etchplanation, ongoing efforts to increase our understanding of granite terrains are rather infrequent. One explanation of this imbalance might be that granite geomorphology lacks an overarching theme, parallel to rock dissolution in karst terrains. The question thus arises whether such a theme can be proposed for granites as well.

Granite geomorphic landscapes may be approached from two major positions, not mutually exclusive. An obvious starting point is to look at the properties of the rock itself and how these control landform evolution and are reflected in the contemporary morphology. At least three main groups of rock characteristics have to be considered: lithology, fabric, and discontinuities. Granites vary in terms of mineralogy, geochemistry, predominant size of minerals, the presence of veins and enclaves. Furthermore, mineral arrangement is important, whether random or organized, as well as the tightness of the rock structure. Finally, jointing patterns exert direct control on the appearance of specific landforms, both convex (tors, bornhardts, ridges) and concave (basins, valleys, caves). Much of existing diversity in granite geomorphology can be explained by the rock factor.

On the other hand, granite landscapes can be analysed in terms of main formative processes involved and among these, deep weathering plays a pivotal role. While the phenomenon of deep weathering as such is by no means unique to granites, its selectivity is often astounding. Juxtaposition of pockets of thoroughly disintegrated rock and unweathered compartments typifies granite-derived weathering mantles in all environmental and geodynamic settings. Thus, subsurface preparation and subsequent exposure of residual landforms from thick weathering mantles is one candidate for an overarching theme in granite geomorphology.

A final note is about the position of granite landscapes in the emerging fields of geoheritage and geotourism. They are often immensely scenic and hence, may appeal even to casual visitors. At the same time, being a rock originated at depth and usually of protracted exposure history, granites have potential to tell fascinating stories in which geomorphology can play a key role.

