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# Changes in the weathering of rock surfaces in different geomorphological environments: glacial, nival and coastal.

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The sclerometer or Schmidt Rock Test Hammer has been broadly applied in geomorphology to estimate the strength of different rock types and to measure the degree of rock weathering. It has been proved that for a rock type, the rebound values are lower in weathered than in fresh rock surfaces. This evidence suggests that if there is any factor that causes a gradual change in the weathering degree, it must be possible to identify a distinctive tendency with the sclerometer. There are two types of factors that can cause gradual changes in the weathering degree. First, those related with the time of exposure of a rock surface, which are the basis of works that attempt to use the sclerometer as a tool for relative chronology. Second, those related with the frequency or duration at which the weathering agents operate, which are the basis for the studies focused on the efficacy of weathering. In both cases it is essential to understand how the factors of weathering are spatially distributed in order to achieve a good sampling procedure.

We applied the sclerometer in three different environments: rock coasts, glacially exposed surfaces and rock surfaces subjected to nival processes. The sclerometer was used in a receding glacier in Tierra de Fuego, Argentina, assuming that the rock surface must be more weathered as more time passed since the exposure. The hypothesis was confirmed by the negative correlation between rebound values and the distance to the glaciar front. In rocky coasts, it was proved by field and laboratory data that one of the main factors responsible for variations in rock strength is the degree of weathering by tidally-induced wetting and drying. We found negative correlations between rebound values and tidal elevation in very different coastal environments in the NW of Spain and in the Beagle Channel. We also found that the absence of this relationship may be caused by processes of mechanical erosion, but they also can respond to disequilibrium of the intertidal surfaces with tidal range. The research on nival processes was conducted in an ancient glacial cirque in the western mountains of Galicia (NW Spain). The hypothesis here was that weathering degree of rock surface is related with the abrasion produced when a late-lying snow cover slides in the spring. The frequency and extent to which abrasion and other erosional processes take place depends mainly on the thickness of the snow accumulated in a rock wall. Therefore, the rock surfaces are more weathered as frequency and intensity of abrasion decreases with the distance to the rock wall.

The experience in three different types of environment suggests that when the sclerometer is used to measure the weathering degree, the sampling method arises as one of the most important factors. The distribution of the sampling points must respond to the characteristics of each area, which needs a previous understanding of the processes and factors responsible of the variations in the degree of weathering.

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