

GEOELECTRICAL DETERMINATION OF SAPROLITE THICKNESS ASSOCIATED WITH THE NORTHERN CENTRAL CORDILLERA EROSION SURFACES, COLOMBIA.

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ABSTRACT

The Colombian Andes are formed by four separate sub-parallel ranges with general S-N to SSW-NNE trend. Specifically, the northern portion of the Central Cordillera shows several erosion surfaces (northward of latitude 5°25'N), ranging between 1800 and 3300m altitude. These erosion surfaces features cover an area of more than 800 square kilometers. The antiquity and great lateral extension of the erosion surfaces provides an adequate spatial and temporal framework in order to evaluate the link between tectonic processes and their effect on large geomorphologic systems. Such erosion surfaces are an excellent starting point for the evolution of the Andes, since they constraint the nature of epeirogenesis and tectonic processes, and also provide a clear framework for the other geomorphologic units, taking into account that successive uplift events caused by epeirogenesis or tectonism may have produced a staircase sequence of erosion surfaces with a simple pattern of ages. Additionally, these topographic features are developed mainly over the same lithological unit (Antioqueño Batolith). Several levels of erosion surfaces have been identified in the area by others authors. However, since conclusive information is lacking, the age of these remnants and the possibility for all of them to belong to a single former surface is still a matter of debate. Taking advantage of the lithological homogeneity, the present work pretends to correlate, in five selected areas belonging to at least three erosional surfaces levels, the thickness of the weathering layer with the relative ages. In each area we carried out several geoelectrical trials (between 3 and 5), using the Wenner array, in different geomorphologic conditions. The results show two main range values. For the highest remnants the soil thickness varies between 56 and 110 m with 78 as mean. For the lower surface, and nicely preserved, the basement depth range is 39 and 63 m with a mean value of 48 m. The wide dispersion is due to local geomorphologic conditions (hill, slope, valley bottom, etc). Additionally, one area shows anomalous results, maybe due to hydrothermal alterations. This methodology represents a fruitful tool to check the possible presence of at least two different erosional surfaces in the Northern Central Cordillera and to unravel the tectonic history of the region.

Key words: chemical weathering, erosion surfaces, Central Cordillera, Colombia