

FOURTH INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY - Italy 1997
Session: Tropical Geomorphology

JORGE LOPEZ PEZ-BLANCO (*), LEOPOLDO GALICIA (**) & FELIPE GARCÍA-OLIVA (**)

**HIERARCHICAL ANALYSIS OF RELIEF FEATURES
IN A SMALL WATERSHED IN A TROPICAL DECIDUOUS FOREST
ECOSYSTEM IN MEXICO**

ABSTRACT: LÓPEZ-BLANCO J., GALICIA L. & GARCÍA-OLIVA F., *Hierarchical analysis of relief features in a small watershed in a tropical deciduous forest ecosystem in Mexico.* (IT ISSN 0391-9838, 1999).

A hierarchical analysis of relief features in a small watershed (Watershed No.1, extent area of 16 ha) was analyzed based on frequencies of slope-angle and slope-morphology parameters in different functional scales (spatial or thematic units), using a geographic information system (GIS) as an essential analyzing information tool. The hierarchical arrangement of watershed's relief is strongly influenced by geologic structure.

The following four scale non-nested hierarchical levels were analyzed: 1. The total experimental watershed (shaped by its hydrologic division), 2. Two generalized orientation facing slopes (North and South, formed by hydrologic division and generalized aspect), 3. Three altitudinal segments (Bottom, Middle and Top, caused by geologic structure and altitudinal division) and 4. Hillslope units (sub-hydrologic division and geometric form).

Fourteen hillslope units were delineated, which were grouped in four types according to their configuration (straight or curved along both length and width).

Two main fractures divide the watershed into three altitudinal sectors. The top sector has flat homogeneous hillslope units, the middle sector has steeper convex hillslope units and the bottom sector has steeper convex and steeper homogeneous hillslope units. Southfacing slope have a longer length slope than northfacing slopes. Longer slopes have greater numbers of changes in the degree of inclination and, as a result, south-facing hillslope units are heterogeneous.

Stream-channel network arrangement are not explained at the watershed level and, slope grade have not correlation with the first-order subcatchments area. However, the fluvial network is strongly influenced by the hillslope-unit morphology.

Finally, the results suggest that exist three different environments where their both, processes of channel initiation and water movement are different.

KEY WORDS: Hierarchical analysis, Hillslope unit, Small experimental watershed, Tropical deciduous forest, Chamela, Mexico.

(*) *Instituto de Geografía, Universidad Nacional Autónoma de México, Circuito Exterior, Cd. Universitaria, A.P. 20-850, CP 04510, México.*

(**) *Instituto de Ecología, Universidad Nacional Autónoma de México, A.P. 70-275, CP 04510, México, D.F.*