

**UPLIFT AGE OF THE GARZON MASSIF (EASTERN CORDILLERA,
S.COLOMBIA) IN RELATION TO THE INFILL OF THE ADJACENT S.NEIVA
BASIN**

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The present investigation was carried out in order to determine the age of the uplift of the Garzón Massif, the most southern extension of the Eastern Cordillera of the Colombian Andes, and its effects on the sedimentation within the adjacent S.Neiva basin. To that purpose fission track age determinations were done on apatite from samples taken at different elevations within the massif and the stratigraphic and sedimentary relations of the deposits filling the adjacent S.Neiva Basin were studied, while K-Ar determinations on these deposits provided the necessary time control.

The S.Neiva Basin constitutes a broad tectonic depression situated between the Central and Eastern Cordilleras in the south of Colombia. It is filled with some 3500 m of fluvial material deposited during uplift of the Central Cordillera and ± 900 m of volcanoclastic and volcanic sediments derived from the Central Cordillera volcanic arc. The fluvial sediments belong to the Gualanday and Honda formations; the volcanoclastic and volcanic deposits are grouped into the Gigante Formation. This latter formation is subdivided into three members: a lower and upper conglomeratic member and a middle volcanoclastic member.

K-Ar determinations were carried out on biotite and hornblende separates from samples taken at stratigraphically controlled positions. The middle volcanoclastic member of the Gigante Formation was dated at 8.3-7.0 Ma and an age of 6.6-6.2 Ma was obtained for the upper conglomeratic member. The lower part of the Honda Formation was dated at 16.1-14.6 Ma. The age of the lower conglomeratic member of the Gigante Formation was estimated at 11-8.3 Ma.

From the effective track retention temperature of apatite and the present elevation of the highest samples it is calculated that the Garzón Massif was uplifted approximately 6.5 km. Apparent fission-track ages of apatites date the uplift at some 12 Ma ago. This implies that the Gigante Formation was deposited after the uplift *s.s.*

Paleocurrent directions from the Honda Formation and lower two members of the Gigante Formation are to the east, indicating that the uplifted massif at first had little influence on the drainage pattern of the basin. Only 5 million years after the uplift, during deposition of the upper conglomeratic member, the drainage system in the basin changed direction and dewatering was to the North.

In the northeastern part of the studied area, the Gigante Formation shows interfingering with conglomerates with a provenance east of the present basin while to the NW only the upper conglomeratic member interfingers with these conglomerates. Apparently, erosion products from the uplifted massif spread further west in time, reflecting the increasing activity of erosion and denudation processes.

However, compared to the vast amounts of fluvial sediments produced during uplift of the Central Cordillera, the thickness of the deposits resulting from uplift of the Garzón Massif is minimal. This fact and the fact that the uplift took place some 12 Ma ago, but that the rivercourses were influenced only 7 million years ago, lead to the conclusion that the uplift of the massif hardly influenced sedimentation processes in the adjacent basin.

There are two possible mechanisms which may have prevented deposition of the major part of the erosion products into the S.Neiva Basin:

1. An alignment of intramontane basins can be found within the Garzón Massif parallel to its western border along one of the major faults. Geoelectrical and sedimentological investigations indicate that one of these basins, the Pitalito Basin, is at least 1200 m deep and is probably filled with Pliocene to

Pleistocene fluvial deposits. However, the electrical conductivity studies do not exclude a much deeper basin that than could be filled, at least the deeper part of it, with erosional products derived from Jurassic intrusives bordering the basin. Therefore, it is conceivable that the intramontane basins were formed during the uplift and acted as a sediment trap, preventing the erosion products from entering the S.Neiva Basin.

2. In the Putumayo Basin directly to the east of the Garzón Massif, some 700-800 m of Upper Tertiary fluvial sediments are found. Possibly the massif was tilted to the east during uplift and the sediments were deposited preferentially in the Putumayo Basin.