

# QUATERNARY TECTONICS OF THE MEDEIROS HILLS, LERMA VALLEY, CORDILLERA ORIENTAL, NORTHWESTERN ARGENTINA (24°30' SL)

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**ABSTRACT:** The Lerma valley is an intermontane tectonic depression located in the Cordillera Oriental. Basement-cored thrust sheets are flanking the valley controlling its N-S elongated shape. The uplift of these basement blocks took place during the late Miocene to the Plio-Pleistocene, synchronously with the deposition of fluvial-alluvial sequences. The Medeiros hills are located at the northern extreme of this valley, being the geomorphic expression of the southward propagation of the Vaqueros anticline. In these hills, middle to upper Pleistocene fluvial conglomerates (Calvimonte Formation) are uplifted more than 150 meters with respect to its stratigraphic position in the undeformed basin. The pattern of 6 strath terraces (T1 to T6 from oldest to youngest) sculpted in the northern sector of the hills has been interpreted as evidences of the forced migration northward of the Vaqueros river during recent uplifting events. The main objectives of this research are to describe the structure of the hills and interpret its tectonic evolution along the Quaternary using new structural, geomorphologic and topographic data.

The subhorizontal conglomerates of Calvimonte Formation overlie unconformably the Piquete Formation (Plio-Pleistocene conglomerates and siltstones) that is dipping 60°/090 and 25°/270 at the eastern and western flanks of the hills respectively. These orientations define an asymmetrical anticline with eastward vergence developed over a ramp dipping 25° to the west and a décollement level probably located at the contact between the structural basement (Precambrian and Eopaleozoic rocks) and the Guanaco Formation (Early Pliocene sandstones and limestones). At the southwestern flank of the hills Piquete Formation is dipping around 10°/220 evidencing the southward plunging of the fold. The axial plane has a N-S trend and is located closer to the frontal limb, being the backlimb much broader. At the frontal flank, a backthrust developed in siltstones of Piquete Formation is folding the overlying Quaternary conglomerates. This fault has N-S trend and could be the responsible of the topographic high located at the eastern flank of the hills. An oblique backthrust dipping 45°/125 is repeating Piquete Formation and displacing the oldest two terraces.

Topographic profiles of the 6 terraces and the Vaqueros river were measured using SRTM DEM and GPS surveying. The profiles were re-projected over an E-W line, perpendicular to the axis of the anticline in order to evaluate if the terraces are deformed. The Vaqueros river has a convex down profile. The terraces profiles, instead, have convex up profiles indicating that were affected by folding processes. The maximum amplitude of the folding is 80 meters for T1. The scarp developed toward the east of T1 and T2 profiles is related with the oblique backthrust that was described above. The easternmost part of T3, T4 and T5 profiles shows the topographic high associated with interstratal slip in the frontal limb of the fold.

Deformed terraces are strong evidences of repeated neotectonic activity in the region during the last 300 Ka. The mean uplift and southward propagation rates of Medeiros anticline for the last 300 Ka can be estimated in 0,5 mm/yr and 40 mm/yr, respectively.

**KEYWORDS:** NEOTECTONICS, DEFORMED TERRACES