DEFLECTION OF RIO SALADO TERRACES DUE TO UPLIFT OF THE SOCORRO MAGMA BODY, SOCORRO, NEW MEXICO

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The Socorro magma body is located in central New Mexico along the intersection of the Socorro fracture zone and the Rio Grande rift. High micro-earthquake activity corresponding to the area of the magma body indicates that it is currently active. While the depth and extent of the magma body have been constrained, the age of the magma body is under debate. Evaluation of the surface disruption caused by the magma body provides clues to the duration of uplift. Specifically, given that the modern rate of vertical deflection can be measured using geodetic techniques, if the amount of deflection of a geomorphic surface above the magma body can be determined, a minimum age for the initiation of deflection can be estimated by dividing the amount of deflection by the modern rate. The modern inflation rate of the magma body has been approximated at one to five mm per year based on leveling surveys and INSAR data. The rapid and localized uplift has deflected the Quaternary terrace surfaces along the Rio Salado, which traverses the zone of maximum uplift.

Uplift due to magma inflation will produce vertical displacement of a riverbed and any associated terraces. Assuming that the rate of channel down cutting keeps pace with uplift, the modern longitudinal stream profile should represent the equilibrium state of the drainage. The paleostream profile, constructed based on terraces, deviates from the equilibrium condition, as estimated from the modern longitudinal profile. Comparison of the modern stream profile with the paleostream profile, as indicated by a distinct marker terrace, shows increasing deflection across the zone of maximum uplift.

Correlation of the Quaternary terraces of the Rio Salado was based on the degree of pedogenic CaCO\textsubscript{3}. Although terrace preservation is poor, there is a terrace that is traceable throughout the length of the research area. This marker terrace is distinguished by being the lowest terrace exhibiting Stage III carbonate horizon development. It is bounded below by a terrace showing weak pedogenic CaCO\textsubscript{3} (Stage I) and above by terraces showing greater pedogenic CaCO\textsubscript{3}. The marker terrace elevation above the active channel increases progressively downstream along the Rio Salado. The distribution of uplift inferred from the channel deflection is consistent with the uplift distribution based on INSAR data.