

## **Sedimentary Geochemistry and Provenance of Late Cretaceous to early Tertiary Sandstones in the La Popa basin, Nuevo Leon, Mexico**

By

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Although sandstone petrography is an excellent method used to determine provenance, sandstone geochemistry provides the ability to pinpoint source terranes. This study focuses on sandstones deposited in the Cretaceous-Tertiary La Popa basin, a foreland basin on the northeast flank of the Sierra Madre Oriental, 50 km northwest of Monterrey, Mexico. The provenance of the five major La Popa sandstone-bearing formations will be determined by combining petrography and whole-rock geochemistry. Previous studies of these units have shown that provenance changes upsection. The basal formation was derived from a fold and thrust belt that contained a volcanic arc. These terranes correspond to the Upper Jurassic-Lower Cretaceous Guerrero/Arperos composite terrane, 650 km southwest of La Popa basin. Sands in the middle of the section are eroded continental arc detritus with some recycled continental block material. The upper two formations have yet to be studied in depth.

The goal of this study is to examine two hypotheses pertaining to the source of the basin sands. Previous Master's theses suggest a largely volcanic provenance. The first hypothesis is to discern whether the sands are from the Guerrero island arc or Arperos oceanic island basalt. The second hypothesis is to determine if basement provenance changed as Hidalgoan (~Laramide) uplift occurred. Whole rock geochemistry and petrography will be used to test these ideas. The ratios of immobile incompatible elements (Ti, Nb, Zr, Y, Ta) will distinguish between the arc and ocean island basalt sources. Changes in elemental abundance and ratios will indicate changes in provenance.