

# DEFORMATIONAL HISTORY ASSOCIATED WITH FLAT-SLAB SUBDUCTION IN THE SOUTHERN CENTRAL ANDES

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## Abstract

The Andes of west-central Argentina (27-33°S) define the best-understood modern example of crustal deformation and high seismic activity above a zone of flat-slab subduction, and form the northern boundary of the petroleum-rich retroarc Neuquen basin. Past studies have variably proposed that the flattening of the slab, maintenance of critical wedge taper, and/or reactivation of inherited structures control Andean deformation. Determining the relative influence and temporal record of these diverse elements will lead to improved understanding of the mechanisms controlling deformation, hydrocarbon distribution, and seismicity in the flat-slab region and northern Neuquen basin, and will provide insights into processes influencing other flat slab and petroleum-bearing retroarc settings worldwide. This project will combine structural geology, sediment provenance, and geo/thermo-chronology with published broadband seismic data to resolve the contrasting kinematic histories and mechanical models proposed for the region. Field-based upper-crustal studies will pinpoint the time-space record of shallow deformation for transects at 28-33°S to define and evaluate north-south (along-strike) variations. Synthesis of surface and broadband seismic data will determine how deep-crustal deformation is variably expressed throughout the region's major structural provinces, which will better characterize the mechanisms and rates of deformation above an active zone of flat-slab subduction and high seismic risk, and will provide insights into the processes controlling hydrocarbon maturation and accumulation in the Neuquen basin.

AAPG Search and Discovery Article #90249 © 2016 AAPG Foundation 2015 Grants-in-Aid Projects