

Thrust Faulting, Exhumation and Formation-Scale Fluvial Architecture within the Hinterland of the Central Andean Fold-Thrust Belt

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Summary

The Altiplano plateau is a large, high (>3 km above sea level), internally-drained basin located within the hinterland of the central Andean fold-thrust belt of Bolivia. We examined outcrops of Oligo-Miocene strata exposed along the eastern margin of the Altiplano plateau in order to characterize depositional styles, basin-fill history, thrust kinematics, and the relationship between deformation and sedimentation. Oligo-Miocene strata in the region are divided into the Luribay Conglomerate and the overlying Salla Beds, both of which unconformably overlie deformed Devonian and Silurian strata. The upper Oligocene Luribay Conglomerate (~250 m thick) consists of clast-supported pebble- to cobble-conglomerate interstratified with minor sandstone and siltstone. These strata were deposited in coarse-grained fluvial and alluvial fan settings that were situated in isolated intermontane basins. Growth strata within the Luribay Conglomerate and thermochronometers from basement units indicate the Luribay Conglomerate was deposited coevally with deformation. Conformably overlying the Luribay Conglomerate are strata of the upper Oligocene-lower Miocene Salla Beds (~750 m). The Salla Beds were deposited in fluvial environments and consist of a basal succession of coarse-grained sandstone and siltstone, a middle succession dominated by mudstone paleosols, and an upper succession of sandstone and siltstone. Deposition of the Salla Beds occurred in a series of interconnected and overfilled intermontane basins as the rate of deformation in the area decreased.

Characteristics of the Luribay Conglomerate and Salla Beds indicate a link between thrust activity and fluvial sand body architecture. Amalgamated fluvial channels within the Luribay Conglomerate and basal portions of the Salla Beds coincide with periods of deformation within the adjacent fold-thrust belt, whereas the more isolated fluvial sand bodies within the middle portion of the Salla Beds are associated with diminished tectonic activity. The relatively higher percentage of sandstone within the upper succession of the Salla Beds is associated with thrust faulting on distal faults. The absence of strata of Eocene age, a period of rapid deformation and exhumation within the fold-thrust belt, demonstrate the limited preservation potential of sediments deposited during early phases of tectonic activity.