



Deformation in the Bolivian Subandes: a reconstruction of geologic structures along two transects across the Andean Front in Southern Bolivia

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The Southern Bolivian Subandes is a highly tectonically active region in the Andes since deformation began approx. 10 Ma ago. The study area is located in the Southern Bolivian Subandes southwest of Santa Cruz. Observations were taken along two transects with each being around 100 km long. They stretch from the Subandes-Interandean boundary into the Chaco Plain.

The northern transect extends from Abapó in the Chaco Plain and it continues west near Vallegrande and ends just west of Pucara near La Higuera. The southern transect initiates near Charagua in the Chaco Plain. Then it continues west through Villa Vaca Guzmán and ends around 25 km west of Monteagudo. Structural and stratigraphic data were collected along the two transects. The locations of major geologic structures such as thrust faults, anticlines and synclines were mapped. The map along with the data from the two cross sections was then used to generate a 3D model of the Subandean fold and thrust belt between Abapó and Monteagudo. The cross sections were then restored to quantify the amount of shortening that had occurred over the past 10 million years. The southern transect has undergone 65 km of shortening while 50 to 80 km of shortening have transpired along the less constrained northern transect. The estimated rate of deformation averages at 8 mm/yr. The timing of deformation may differ between the two transects. Deformation may have initiated earlier or undergone at a faster rate in the northern transect than in the southern transect. It is also possible that the decollement is shallower in the western portion of the northern transect.

We observe that the east propagating anticlines verge to the west. This may be due to the anticlines being cut by exposed or blind thrust faults and then rotated counterclockwise. They rotate while piggybacking on younger thrust faults that developed and propagate to the east of the anticlines. We postulate deformation continues to propagate eastward into the Chaco Plain as blind thrusts below the surface. Available seismic data are analyzed in order to provide better constraint for the 3D Model of the fault and thrust belt.