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140-3 Tectonic implications of Eocene-Oligocene shortening during magmatic quiescence in the northern Andes.

Session: Building the South American Cordillera, Paleozoic to Recent: Insights from Geo-Thermochronology

Presenting Author:

Maria Reinoso

Authors:

Reinoso, Maria Dolores¹, George, Sarah W.M.², Parra, Mauricio³

(1) Department of Earth Marine and Environmental Sciences, The University of North Carolina at Chapel Hill, Chapel Hill, NC, USA, (2) Department of Earth Marine and Environmental Sciences, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA, (3) Institute of Geosciences, University of Sao Paulo, Sao Paulo, Brazil

Abstract:

The Eocene–Oligocene represents an enigmatic interval in the tectonic evolution of the Northern Andes, characterized by contractional deformation during a major lull in magmatic activity across Colombia. We present measured sections, growth strata analysis, and detrital zircon U-Pb geochronology from Eocene–Oligocene strata on the western flank of the Eastern Cordillera in the Upper Magdalena Valley to evaluate the tectonic processes during this period (between approximately 3–4°N). Facies suggest that the Eocene–Oligocene Gualanday Group was deposited in an alluvial fan to fluvial environment characterized by braided and meandering river systems and flood plain deposits. The Gualanday Group contains multimodal zircon U-Pb age spectra with four main age peaks attributed to progressive unroofing of the Central Cordillera: (1) a broad age group between ~1700–900 Ma, interpreted as multicyclic zircons originally derived from Precambrian cratonic sources, which are prevalent in proximal Paleozoic and Cretaceous rocks; (2) zircons between 300–250 Ma, attributed to the Cajamarca Complex and Paleozoic granitoids in the Central Cordillera; (3) a Jurassic age group between 200–150 Ma linked to the local Jurassic batholiths and Jurassic Saldaña Formation; and (4) a Late Cretaceous peak (~91–82 Ma) associated with proximal Cretaceous plutons. One sample from the Upper Gualanday Group yields a maximum depositional age of ~34 Ma, consistent with continued Gualanday deposition into the Oligocene.

We also document two growth strata packages in the lower and upper Gualanday Group, associated with syntectonic deformation in the footwall of a west-vergent splay of the La Pava fault. This structural configuration requires syn-depositional shortening during the Eocene–Oligocene.

These observations are consistent with a broader pattern of ongoing deformation during the ca. 50–30 Ma magmatic lull. We consider possible drivers of shortening-related deformation during arc shutoff including: (1) flat-slab subduction, (2) outboard accretion, and (3) transpressional/transensional deformation along the Andean margin, associated with oblique convergence.

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Tectonic implications of Eocene-Oligocene

**shortening during
magmatic quiescence
in the northern Andes.**

Category

Topical Sessions

Description

Session Format: Oral

Presentation Date:

10/20/2025

Presentation Start

Time: 02:05 PM

Presentation Room:

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