The Amado event—a glacioeustatic signal across the Middle-Late Pennsylvanian boundary in central and southern New Mexico

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Pennsylvanian world



Drivers of sedimentation in the Pangean tropics

Glacio-eustasy due to orbital forcing by eccentricity cycles (100 and 400 kyr)—well seen in midcontinent cyclothems **Ancestral Rocky** Mountain tectonics Autocyclic driverslocal climate, delta switching, etc.



Missourian deglaciation



Ancestral Rocky Mountain (ARM) orogeny



Ross & Ross (1987)

Tectonics

Non-repetitive (disorganized) facies stacking Particular facies not plausibly produced by glacioeustatically-driven sedimentation (e.g., fanglomerates, etc.) **Unconformities** Lateral facies variation



In NM, there appear to be some eustatically-driven, shallowing-upward cycles Best example: Penn-Perm transition in Big Hatchet Mountains, SW NM

New Well Peak cyclothems





Lucas et al. (2017) *Stratigraphy*

Biostratigraphy





Micropaleontological age control of Middle-Late Pennsylvanian Precise position of Desmoinesian-Missourian boundary

The "Amado event"

A glacio-eustatic signal in southern and central NM Named for Amado Member of Atrasado Formation—a thin (10-20 m thick) and persistent limestone unit that straddles the Middle-Late Pennsylvanian boundary Amado facies are muddy wackestones and floatstones bracketed by clastic strata—Amado deposition took place during a time of relative tectonic quiescence Can be correlated/recognized across an ~ 250 km long transect from the Sacramento Mountains to Sandia Mountains in southern and central NM





In Alamo clastic trough, thin tongue of upper Gray Mesa Formation straddles Middle-Late Pennsylvanian boundary

Sacramento Mountains



from Lucas et al. (2021)

Cerros de Amado, Socorro County

Type Amado = relatively thin, persistent, limestone-dominated unit

Between two clastic-dominated intervals

Conodonts correlate to 4 cyclothems

Amado Member

fossil plant bed

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Bartolo Member



Cedro Peak, Manzanitas Mountains



Similar stratigraphy in Sandia Mountains to north



The Amado event

	North 🗲			— ~ 250 km				-> South
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What caused the Amado event?

Correlates to major deglaciation event in Gondwana Recorded by limestone interval that likely formed during time of relative tectonic quiescence in the ARM orogenic belt of NM So, supports conclusion that this is a eustatic signal But, a complex signal of multiple glacio-eustatic events



Amado event = Middle-Late Pennsylvanian boundary glacio-eustatic signal

