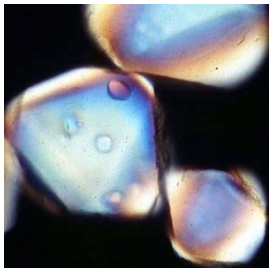
Midwest Geologists Offer New Look at Ancient Continental Collisions
Date: Nov. 14, 2000
By: Chris Curran
Phone: (513) 556-1806
Archive: Research News
Images by: Colleen Kelley and Warren Huff

Cincinnati -- A team of geologists has accumulated extensive evidence that contradicts a previous view of how the continents which formed Gondwana collided and came apart to form what is now North and South America.

University of Cincinnati geologist Warren Huff will explain the evidence during a talk Tuesday, Nov. 14 during the annual meeting of the Geological Society of American in Reno, Nevada. Huff has been working with Dennis Kolata of the University of Illinois and Stig Bergstrom of Ohio State for several years to collect and analyze deposits from ancient volcanoes.

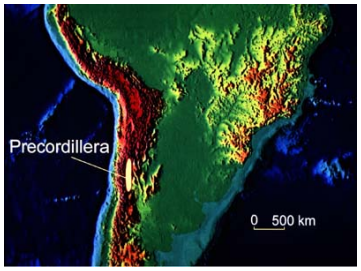


The deposits, known as K-bentonites, were formed after massive volcanism in the Ordovician Period roughly 450 million years ago. By tracking these deposits across continents, Huff and his collaborators can reconstruct how the ancient land masses moved.

A previous model (Dalziel et al., 1994) concluded that the continents which became North and South America went through a massive collision, before moving apart into their present-day locations. "We don't agree with that model," said Huff. "Technically, it's possible, but in the time frame we're considering, it doesn't make much sense. "

For example, Huff explained that fossil evidence indicates South America went through an Ice Age at the end of Ordovician. However, the previous model requires the South American land mass to be nearly at the equator during that time.

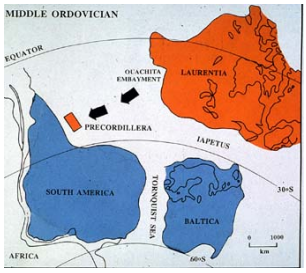
Huff and his colleagues don't dispute that a collision occurred. The massive volcanism which produced the deep K-bentonite beds is clear evidence that land masses were crunching together. "The question is...what was colliding with what? We believe it was a group of very small terrains much like the western Pacific today where island chains are moving toward mainland Asia. Bits and pieces attached over time."



The strongest evidence for the "bits and pieces" approach comes from the Argentine Precordillera where bentonites have been recovered from dozens of sites. The Precordillera formed before the Andes and contains fossils which are similar to those found in North America, but very different from those found elsewhere in South

America.

In the revised model, the Precordillera land mass could have come from North America or simply been in a similar environment (tropical to semi-tropical).



If it did break or rift away from the North American land mass (known as Laurentia), Huff said the rift must have occurred well before the mid-Ordovician collisions. He also noted that the rifting would be consistent with what's known about the eastern United States.

"It's a very broken up continent," said Huff. "The Appalachians stop abruptly near Birmingham, Alabama. Part of the Appalachians are probably part of Africa today. The east coast has a history of this kind of fracturing."

Huff's work is supported by the National Science Foundation and conducted in collaboration with CONICET, a scientific consortium in Argentina.