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Simplifying Cuba

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The Cuban orogenic belt is exceedingly complex. The idea of simplifying it may seem quixotic but doing so emphasizes some of the fundamental aspects of its tectonic evolution, particularly as these affect our thinking about the evolution of the western Caribbean as a whole.

The Cuban crustal section consists of pre-orogenic and post-orogenic units. Pre-orogenic crust includes three separate provinces which extend the length of the island. The largest of these is the island arc province, or Zaza Terrane. It comprises about 80% of the exposed orogen and extends across most of central and southern Cuba. The carbonate platform is contiguous with the Bahamas Platform to the north. The third province is the pelagic basin province which lies between the platform and the arc. The rocks of each province have, in part, been structurally dissected by thrust faulting into a series of linear belts that have been stacked one on another, south to north.

The carbonate platform province is the southern extension of the Bahamas platform and has a similar history. Pelagic basin rocks represent the remnants of the oceanic basin that opened between North America and South America/Africa beginning in the Late Jurassic. The pelagic sections record the full depositional history of this basin from basal affiliates to terminal molasse. The oldest volcanics in the Zaza terrane are of Aptian/Albian age. They rest on an ophiolite section of older but undetermined age.

The Cuban orogeny culminated in Middle Eocene time with the convergence and collision of the Zaza arc with the carbonate platform. Most of the deformation currently preserved in the sections is apparently Eocene in origin. There are indications that the first stage of the orogeny may have occurred as early as Maastrichtian time. The Zaza arc has shut down and is cooling by this time and the first of the pelagic basin thrust sheets may have been emplaced southward beneath the arc by that time. This suggests that the northward emplacement of the arc toward the platform involved thin-skinned thrusting rather than a typical steeply-dipping subduction zone mechanism associated with active arc volcanism. The presence of the Pinos and Escambray metamorphic domes within the Zaza thrust sheets lend support to this idea if they be viewed as metamorphic core complexes. These observations suggest that much of Cuba, particularly the western part, may in fact be thin-skinned, with pelagic and carbonate platform rocks lying at no great depths beneath a thick Zaza overthrust.

Biographical Sketch

Eric Rosencrantz is a research scientist at the University of Texas Institute for Geophysics in Austin. His main research interests are structural geology, tectonics, and plate tectonics, primarily as they apply to the Caribbean region.

Dr. Rosencrantz received a B.A. in geology from the University of Vermont in 1975. He earned a Ph.D. in geology from the State University of New York at Albany in 1980 with a dissertation on the crustal structure of the Bay of Islands ophiolite complex, Newfoundland. That year, he joined the University of Texas Marine Science Institute in Galveston and moved to Austin two years later when the research group was reorganized.

Eric has participated in eight seafaring research cruises including one aboard the *Glomar Challenger*. Current projects include the compilation of Caribbean geological data for the PLATES project, an analysis of the opening of the Caymen Trough as seen in marine magnetic anomalies, a synthesis of the geology of Cuba, and an investigation into some intriguing gravity patterns detected in the western Caribbean.

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