Discovery of the oldest fossils of Panama: Early Cretaceous radiolarians from Miocene conglomerate in the Canal Zone

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Here we present the first report of Panam'a, so far, oldest fossils: Early Cretaceous (late Hauterivian - Barremian) radiolarians recovered by HF- treatment form chert granules-pebbles collected by D.B. and R.M. in a Miocene fluvial conglomerate recently excavated for the enlargement of the Panama Canal (Fig. 1).

Panama's oldest fossils were previously reported from radiolirites interbedded with oceanic plateau lavas in the Azuero Complex, W Panama (Kolarsky et al. 1995, references in Buchs et al. 2010). They revealed a Coniacian-Santonian radiolarian assemblage very similar to that recovered in oceanic plateau sequences from the youngest part of the Nicoya Complex, N Costa Rica (Bandini et al. 2008, Baumgartner et al. 2008). These radiolarian assemblages are also possibly similar to that reported in E Panama (Bandy & Casey 1973), where preliminary results from on-going regional work (GRIP, https://panamageology.wordpress.com/) also suggest their association with plateau lavas. Most of the Upper Cretaceous oceanic plateau sequences in the region are likely part of the Caribbean Large Igneous Province (CLIP) that extends over most of the Caribbean Plate (Fig. 1 inset). Other Cretaceous fossils in Panama include foraminifers in upper Campanian pelagic limestones that locally unconformably overlie Coniacian-Santonian oceanic plateau sequences, and are thought to represent a regional stratigraphic marker associated with the initiation of the Panama volcanic arc on top of the SW margin of the CLIP (Buchs et al. 2010, Barat et al. 2014).

The finding of Early Cretaceous radiolarians in chert clasts reworked into a Miocene conglomerate in the Canal Zone is a significant result that reveals existence of an older (pre-CLIP) oceanic basement in the Panama Isthmus. The clasts yielded poorly preserved but diverse radiolarians. Co-occurrences of Pantanellium sp. aff P. cantuchapai Pessagno & MacLeod sensu Baumgartner et al. 1995 and Stylospongia (?) titirez Jud give the shortest age assignment from late Hauterivian to early Barremian (UAZ95 20-21). Squinabollum simplex (Taketani) also has its first appearance in UAZ95 20, however, this assignment is tentative in view of corroded specimens. A somewhat broader age can be assigned by the first occurrence of Cyclastrum planum Jud in early Hauterivian (UAZ95 19) and disappearance of representatives of Spinosiscapsa in early Aptian.

In Central America such assemblages are only known from Middle Jurassic to Lower Cretaceous radiolirites in the Santa Rosa Accretionary Complex, N Costa Rica (Bandini et al. 2011), and those magmatically reworked in the Nicoya Complex (Denyer & Baumgartner 2006). These occurrences, including the one reported here, suggest that Early Cretaceous and older, far-travelled plateau fragments out of Panthalassa, accreted along, or form the basement of, the CLIP. Provenance constraints from the Canal conglomerate favors occurrence of an older plateau at the base of the CLIP and the Panama Isthmus, which remains to be found in situ in central Panama.
Figure 1. Late Hauterrivian – Barremian radiolarians from the Panama Canal Zone. 1) Cyclastrum planum (Jud), 2) Becus helenae (Schaaf), 3) Crucella cachensis Pessagno, 4) Spinosiscapsa typica (Rüst), 5) Squinabollum sp. cf. S. simplex (Taketani), 6) Gongylothorax sp., 7) Hiscoccapsa utriculus (Parona), 8) Pantanellium sp. aff. P. cantuchapai Pessagno & MacLeod, 9) Pantanellium squinaboli (Tan), 10) Stylospongia (?) titirez Jud, 11) Cryptamphorella conara (Foreman), 12) Cryptamphorella sp., 13) Thanarla brouweri (Tan), 14) Svinitzium puga (Schaaf), 15) Pseudodictyomitra lilyae (Tan), 16) Pseudoeucyrtis sp., 17) Crolaniu sp. cf. C. cuneatum (Smirnova & Aliev), 18) Dictyomitra pseudoscalaris (Tan) sensu Schaaf, 19) Xitus clava (Parona), 20) Thanarla conica (Aliev), 21) Archaeodictyomitra lacrimula (Foreman), 22) Archaeodictyomitra vulgaris (Pessagno)

References

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