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Biogeographic mixing in the Maastrichtian of Angola

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Our field work in the Maastrichtian deposits of southern Angola has yielded a large and diverse collection of marine amniotes, including turtles, plesiosaurs and mosasaurs. Of these, the turtles and mosasaurs are taxonomically most similar to the Tethyan faunas found in Maastrichtian deposits in North Africa and the Middle East, localities in which plesiosaurs are an extremely rare component. Conversely, plesiosaur fossils at the Angolan locality are as numerous as the mosasaurs and in relative abundance only exceeded in Antarctica, where remains of plesiosaurs significantly outnumber those of mosasaurs and turtles are absent. Five genera of mosasaurs have been reported from Antarctica, two of which are also known from New Zealand, three from Patagonia, and two from Angola. One of the Angolan plesiosaurs, an aristonectine, shares a close relationship with forms from Patagonia, New Zealand, and Antarctica, a component of the so-called Weddellian biogeographic province. The North African and Angolan localities were at approximately equivalent antitropical paleolatitudes at the time of deposition, roughly 25° North and South respectively; however, the Angolan locality has a paleo-sea-surface-temperature of ~18°C compared to a marine amniote fossil bearing locality in North Africa, which yielded a significantly warmer temperatures of ~25°C. Reported temperatures from Antarctica range from ~4°C-~10°C. Inferred isotherms delimited by the distribution of thermally sensitive invertebrate organisms suggest an early onset of a South Atlantic Gyre, bringing colder high latitude waters up the coast of West Africa and warmer waters southward along the eastern coast of South America. Faunal mixing of Tethyan and Weddellian taxa in Angola at 25° South paleolatitude is the most northward extension of this phenomenon. In this context, recent work on thermoregulation in mosasaurs, plesiosaurs, and turtles, may explain in part the biogeographic distribution of these taxa.

