

## DEEP TIME CONSERVATION PALEOBIOLOGY OF THE ATLANTIC JIGSAW PUZZLE AND THE FUTURE OF THE SOUTHWESTERN ANGOLAN COAST

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The puzzle-like fit of Africa and South America reflects the tectonically driven opening of the South Atlantic Ocean beginning over 130 mya. By 90 Ma, the North and South Atlantics were conjoined. The introduction of Cretaceous marine reptiles into the central South Atlantic from the north coincides with through-flow in the Equatorial Atlantic Gateway and with increased productivity and upwelling of the Benguela Current. The K-Pg extinction saw the demise of most marine reptiles, but upwelling apparently persisted, evidenced by a growing Cenozoic fossil record of sea turtles and marine mammals from the Angolan coast. Convergent similarities between the Cretaceous marine reptile vertebrate community and the modern vertebrate community of the Benguela Large Marine Ecosystem suggest essentially continuous productivity related to upwelling along the southwest African coast since Cretaceous time. Paleolatitude reconstructions show that predicted positions of coastal upwelling of the Benguela Current have moved south along the coast as Africa drifted northward through the descending limb of the southern Hadley Cell. The Cretaceous and modern faunas were both adapted to a productive upwelling zone. The Cretaceous relict *Welwitschia mirabilis* is consistent with coastal aridity alongside upwelling. Thus, the sediments of coastal Angola and the fossils they entomb are relevant to conservation paleobiology because they provide a baseline through deep time. Comparisons underscore the resilience of the Benguela Current on the one hand and emphasize human-driven threats to the Benguela Large Marine Ecosystem on the other. Solutions are being sought; for instance, through the evaluation of Ecologically or Biologically Significant Marine Areas (EBSA) in the Benguela Current Large Marine Ecosystem. In Angola, the geologic record of the opening of the South Atlantic, the fossils, public interest, and the value for sustainable development are positive indications for the future.

Keywords: Angola, Benguela Current, marine reptiles, upwelling

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