

Paleogeographic development of the Southwestern Pacific Basin

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Early Paleozoic paleogeography was revolutionized in 1991 by a new understanding that during the late Proterozoic East Gondwana (including Antarctica, Australia, Southeast Asia, and China) had rifted away from western North America. This gigantic continental fragment swung like a door through the proto-Pacific. By the beginning of the Cambrian, when precursors to the worldwide animal groups suddenly acquired protective hard parts, wide seas isolated the fragment from the other continents and led to locally distinctive Cambrian faunas.

The tectonic swing continued on, and local compass directions passed through a large circuit. Finally, during the Middle Cambrian, East Gondwana came against the back side of Africa. The various shield areas of Africa and South America were shoved together, and the new continent of Gondwana was in place.

But the relentless push of the trailing oceanic ridge did not cease with the consolidation of Gondwana. As the intercratonic subduction zones wheezed into inactivity, the convergence transferred to the trailing rifted margin of Australia and Antarctica.

The consolidation of Gondwana as a whole had taken place mainly along two oceanic closures, one near the present east coast of South America, and the other near the east coast of Africa. When closure was complete in the Ordovician, these sutures intersected approximately at right angles with the

newly created ragged continent-ocean boundary between Gondwana and the original Tethys.

Almost immediately, a new spreading axis formed along this boundary, passing both along the margin, and in places cutting off subcontinental masses that extended away from its general trend. During the Silurian, North and South China pulled away from present-day northwestern Australia and India. Subsequently, the spreading axis jumped in successive stages farther and farther into the body of Gondwana. During the Devonian, Indochina and Malaya were pulled off; during the Permian, Tibet and Sibumasu (Burma-Thailand); during the Jurassic, western Burma and Sumatra; and during the Cretaceous, Australia and India, the very heart of Gondwana.

Ridge push from these evolving spreading axes soon generated subduction zones within and at the opposite side of Tethys, and the waves of rifted subcontinents moved with the oceanic crust that separated them and docked successively at the margin of the developing continent of Laurasia. Indochina and Malaya joined with South China to form Cathaysia during the Carboniferous, Cathaysia then joined with North China during the Permian, and this whole assemblage became attached to Siberia during the Triassic. Tibet and Sibumasu also joined with Laurasia during the Triassic, and West Burma, Borneo, and Sumatra arrived during the Jurassic and Cretaceous. The final major fragment to land was India, in the Eocene, and Australia continues its approach.