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888 – 444 Ma global plate tectonic reconstruction with emphasis on the formation of Gondwana

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The formation of Gondwana results from a complex history, which can be linked to many orogenic sutures. Those sutures have often been gathered in the literature under broad orogenies — in particular the Eastern and Western Pan-African Orogenies — although their ages may vary a lot within those wide belts.

The Panalexis model is a plate tectonic model, which aims at reconstructing 100% of the Earth's surface, and proposes a geologically, geometrically, kinematically, and geodynamically coherent solution for the evolution of the Earth from 888 Ma to 444 Ma. Although the model confirms that the assembly of Gondwana can be considered complete after the Damara and Kuunga orogenies, it shows above all that the detachment and amalgamation of “terranes” is a roughly continuous process, which even persisted after the Early Cambrian.

By using the wealth of Plate Tectonics, the Panalexis model makes it possible to derive numerous additional data and maps, such as the age of the sea-floor everywhere on the planet at every time slices, for instance. The evolution of accretion rates at mid-oceanic ridges and subduction rates at trenches are shown here, and yields results consistent with previous estimates. Understanding the variation of the global tectonic activity of our planet through time is key to link plate tectonic modelling with other disciplines of Earth sciences.