

The geodynamic map and evolution history of the Neoproterozoic supercontinent Rodinia

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We present a synthesis of the evolution of the Neoproterozoic supercontinent Rodinia, and the first geodynamic map of Rodinia - a final product of IGCP440. We based our work on both palaeomagnetic constraints and on geological correlations of basement provinces, orogenic histories, sedimentary provenance, the development of continental rifts and passive margins, and the record of mantle plume events including Large Igneous Provinces. The full paper (Z.X. Li et al., *Precamb. Res.* 160, 179-210, 2008), the Rodinia Map, and an animation of global palaeogeography between 1100 Ma and 530 Ma, are available online at: <http://dx.doi.org/10.1016/j.precamres.2007.04.021>.

Rodinia assembled through worldwide orogenic events between 1300 and 900 Ma, with most of the continental blocks known to exist at that time being part of it. In our preferred Rodinia model, the assembly process featured the accretion or collision of continental blocks around the margin of Laurentia.

Like the supercontinent Pangaea, Rodinia lasted about 150 million years after complete assembly. Sinking of stagnated slabs accumulated at the mantle transition zone surrounding the supercontinent, as well as thermal insulation by the supercontinent, led to the formation of a mantle superswell (or superplume) beneath Rodinia 40-60 million years after the completion of its assembly. As a result, widespread continental rifting occurred between ca. 825 Ma and 740 Ma, with episodic plume events at ca. 825 Ma, ca. 780 Ma and ca. 750 Ma.

The break-up of Rodinia also occurred diachronously. The first major break-up event occurred along the western margin of Laurentia (present coordinates), possibly as early as 750 Ma. Rifting between the Amazonia craton and the southeastern margin of Laurentia started at approximately the same time, but only led to break-up after ca. 600 Ma. By this time, the western Gondwanan continents were assembling, although the formation of Gondwanaland was not complete until ca. 530 Ma.