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# How ‘cyclic’ is the Supercontinental Cycle

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Precambrian paleogeography currently attracts a lot of attention from Earth scientists in various disciplines. This interest is particularly linked to the supercontinental cycle hypothesis and its relationship with global geodynamic processes. Most of the geoscience community accepts this hypothesis as plausible, but its details are still debated for several reasons. First of all, there is no consensus about the definition of a supercontinent. For example – is Gondwana a supercontinent? Depending on the answer, various estimations of the longevity of supercontinent cycle(s) arise. Another concern regards the methodological approach to paleogeographic reconstructions. For instance, some consider that the Precambrian supercontinent Nuna (aka Columbia) was assembled as a result of the widespread 2.0-1.8 Ga orogenies. However, careful consideration of geological, geochronological and paleomagnetic evidence instead suggests that supercontinent building blocks were assembled during this 2.0-1.8 Ga time interval, but that assembly of these building blocks into a supercontinent only occurred about 200 Myr later. There are only two quantitative tools for Precambrian paleogeographic reconstructions – paleomagnetic data and regional mafic dyke swarms geometries. Unfortunately, there are not yet enough high quality Precambrian paleomagnetic data to produce Apparent Polar Wander Paths (APWPs) for most Precambrian continents and to reconstruct their relative position with respect to each other, as was done for Phanerozoic paleogeography. Consequently all published reconstructions of Precambrian supercontinents are suggestive but not definitive. The only way to build a plausible Precambrian paleogeographic reconstruction is to combine paleomagnetic data with geological, geochemical and geochronological evidence. For example, the combination of paleomagnetic data with matching coeval Large Igneous Provinces (LIPs) and their regional dyke swarms, is helpful, but has limitations. Paleomagnetic and LIP databases are growing fast, causing revisions of published supercontinental reconstructions. In this presentation I summarise newly published paleomagnetic, geological and geochronological data and propose a new kinematic model of ca. 1800-900 Ma global paleogeography. In summary, the following published data have been used for a modification of previous models: (i) new paleomagnetic and geochronological data from Mesoproterozoic and Early Neoproterozoic rocks in Baltica, North China, Sao Francisco, Amazonia, Australia; (ii) new discoveries of LIPs with ages between 1800 and 900 Ma in Siberia, North China, Sao Francisco and Congo; (iii) new geological and geochronological data from Europe and South America, which do not support the popular SAMBA model of a long-lived connection between Baltica and Amazonia in late Paleoproterozoic and Mesoproterozoic times. These and other multi-disciplinary data are sometimes contradictive to each other; so some parts of the new model need further testing. New data support the hypothesis of ca. 300 m.y. connection between the Siberia, Sao Francisco, Congo, North China, Amazonia and West Africa at 1800-1500 Ma. New paleomagnetic data from the Sao Francisco craton do not support the hypothesis that the Congo/ Sao Francisco craton was part of Rodinia. This new paleogeographic model causes some re-estimation of the timing and longevity of the process of supercontinental assembly and breakup.