

Is there a secular change in supercontinent assemblies?

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High frequencies of craton collision occur during supercontinent assembly at 1800, 1100, 650-300 and <100 Ma and low rates during breakup at 2100, 1300-1200 (?), 750, and 200-100 Ma. Angular plate velocities as weighted by craton area range from 20 to 80 deg/100Myr with two peaks at 450-350 Ma and 1100 Ma, both of which correlate with the initial stages of supercontinent assembly. The number of cratons decreases from ≥ 15 before 1900 Ma to < 10 after this time. Orogens and passive margins show the same two cycles of ocean basin closing at 2700 to 2000 Ma and at ≤ 2000 Ma. The younger cycle shows decreasing durations of ocean basin closing until about 1000 Ma. Supercontinent assembly and breakup durations are 200-300 Myr and 100-200 Myr, respectively. Except for 1200-700 Ma, duration of ocean-basin closing is ≤ 150 Myr. Time-averaged plate speeds suggest more sluggish plate tectonics in the past, which is consistent with a possible increase in craton collision frequency in the last 1000 Myr. If Gondwana and Pangea are counted as stages of the same supercontinent, the supercontinent cycle has a period of about 500 Myr and there is no clear evidence for it speeding up or slowing down with time.