

## **Continent growth: Creation vs. preservation**

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The well-known “peak and trough” distribution of U-Pb zircon ages of rocks from the continental crust is interpreted in two ways: 1) the peaks represent times of preferential preservation of crustal material; 2) they represent periods of accelerated crustal growth. Behind the first interpretation is the observation that there is little net crustal growth in subduction zones, which leads to the hypothesis that crust is preferentially preserved only during continent-continent collisions, as during the assembly of supercontinents. This hypothesis fails, however, because 1) supercontinent assembly is a long (200-500 m.y.) drawn-out process comprising numerous continent collisions, not the short, sharp events represented by the age peaks, and 2) unlike peaks younger than 1 Ga, the large peaks from 2.7 to 1.0 Ga do not correlate with periods of supercontinent assembly. The older peaks correlate instead with times of LIP emplacement and this supports the hypothesis that they are related to accelerated mantle convection. During periods of major mantle plume activity from 2.7 to 1 Ga, transfer of large volumes of material from lower to upper mantle increased the rate of return flow; i.e. subduction. In the Archean, as now, granitic magma formed in subduction zones (models invoking melting of thick basaltic crust are implausible because the anhydrous olivine-pyroxene cumulates in the lower parts of such crust cannot produce voluminous granitic magma). The acceleration of subduction led to an increased rate of granite production and thus a peak in the rate of continent growth.