

Granitoids of the Central Asian Orogenic Belt and Continental Growth in the Phanerozoic

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The Central Asian Orogenic Belt, otherwise known as the Altaid Tectonic Collage, is characterized by voluminous emplacement of Paleozoic to late Mesozoic granitic intrusions (calc-alkaline, alkaline to peralkaline series) during 500 to 100 Ma. The granitoids of the northern belt (central Mongolia to Transbaikalia) are characterized by positive $\epsilon_{\text{Nd}}(\text{T})$ values of +1 to +10 and young Sm-Nd model ages (T_{DM}) of 300 to 1200 Ma. Similarly, except some granitoids with negative $\epsilon_{\text{Nd}}(\text{T})$ values (0 to -5) found in Tianshan and Altai Mountains, most granitoids from the southern belt (Xinjiang-Inner Mongolia-NE China) have low initial Sr isotopic ratios (≤ 0.705) and positive $\epsilon_{\text{Nd}}(\text{T})$ values : 0 to +6 for northern Xinjiang, +3 to +5 for Inner Mongolia, and 0 to +7 for NE China. All of them have young T_{DM} model ages (<1000 Ma). These data indicate the relatively juvenile character of the granitoids which were produced from parental rocks or magmas separated shortly from depleted mantle sources.

The evolution of the Central Asian Orogenic Belt is related to accretion of arc complexes and terranes or microcontinents. In addition, the emplacement of large volume of post-tectonic A-type granites requires another mechanism - probably through a series of processes including underplating of massive basaltic magma, partial melting of the mixed rock assemblages of the lower crust to produce granitic liquids, followed by extensive fractional crystallization. In any case, the recent identification of very large volumes of Phanerozoic « juvenile » crust produced in Central Asia, North America and elsewhere suggests a significant addition of new crust in the Phanerozoic. A re-evaluation of crustal growth models is needed. (*Contribution IGCP-420*).