Crustal growth in the Central Asian Orogenic Belt (the Altaids): Nd isotope evidence

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The Central Asian Orogenic Belt (CAOB) or the Altaid Tectonic Collage represents a complex evolution of Neoproterozoic to Phanerozoic orogenic belts. It is a prime example of accretionary orogeny. A common characteristic feature of the individual orogens in Central Asia is the complex but recurrent arrangement of accretionary prism and magmatic arc material, interspersed with massifs of Precambrian terranes and slivers of oceanic crust. All the orogens are intruded by massive granitoids of early Paleozoic to late Mesozoic ages. Overall, the CAOB grew southward from the Siberian Craton. The final closure of the Paleo-Asian Ocean probably took place in the late Permian when the North China Craton was attached to the CAOB.

Nd isotope tracer studies revealed that massive juvenile crust was generated in the CAOB. While this being true, continued isotope analyses reveal that in some terranes Precambrian crust has also played an important role in the generation of the apparent "juvenile" crust. The juvenile crust was likely produced in two ways: by lateral accretion of arc assemblages and syntectonic granitoids, and vertical accretion of non-orogenic granitoids and their volcanic equivalents. However, ocean closure and arc accretion are still considered to be the dominant process of crustal formation in the CAOB. Available Nd isotope data indicate that the proportion of the mantle component in post-orogenic granitoids appears to be greater than that in syntectonic granitoids. An example of isotope mapping and more quantitative estimate of crustal growth in the Chinese Altai will be presented. (In memory of my old friend Shen-su Sun; NSC grants 93-2116-M-001-025, 94-2116-M-001-021).