# Thermochronologic “hearing” of the roots of Caledonian Mountains of the Central Asian fold belt: Are they parts of a single orogen?

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The Central Asian fold belt incorporates rock units derived from a variety of geodynamic settings, evolved the Paleo-Asian Ocean (PAO). One of the key events in the history of the PAO was at the Late Cambrian – Ordovitian. At the western framing of the Siberian Craton this time is marked by collision of island arcs and microcontinents, ridge subduction and closure of interarc, backarc basins. As a result the formation of large scale orogenic belts of different configuration have been suggested. We assume that belonging of different accretion-collision structures to single large-scale orogen can be clarified on the base of reconstruction of their tectonothermal history.

We consider radiogenic isotope geochronology data on Caledonian Olkhonskaya and Western Sangilen (Tuva) accretion-collision structures and compare them with published data on Slyudyansky crystalline complex, Derba terrain, Bayankhongor Ophiolite Zone (Mongolia).

The thermal histories of similar duration (~ 100 Ma) for all five accretion-collision structures are reconstructed. The coincidence of the age of at least four successive stages in their tectonothermal histories is observed. It seems to be convincing to assume that studied accretion-collision structures have been parts of the single large-scale orogenic belt formed at the scene of Vendian – Early Paleozoic island arc system which bordered the Siberian Craton.

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# The noble gas composition of the Earth’s mantle

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Defining the noble gas isotopic state of the terrestrial mantle is of primary importance to elucidate origin, evolution and geodynamics of the Earth [1]. Important advances have been achieved in the last decade: It was recognized that the Earth acquired solar wind gases (He, Ne-B) by solar corpuscular radiation [1-5], implying major accretion after protoplanetary disk dissipation. Nonradiogenic isotopes of Ar, Kr, Xe have rather atmosphere-like composition [2, 6-8], except for a minor solar or planetary Xe component [8], raising the possibility of substantial recycling into the mantle. Mantle plumes are now well characterized: Hawaii [2], Iceland [2, 9], Réunion [5], or the fossil Kola plume [10]. Moreover, the composition of the subcontinental lithospheric mantle was determined for several localities using peridotitic rocks [4, 11-14]. It appears that important processes are the local occurrence and mixing of variably fractionated different mantle components [4-6, 11-16], occasionally influenced by more or less fractionated atmospheric and crustal components, possibly related to subduction and fluid transport in the lower crust and uppermost mantle [13-17]. A precondition to trace these processes is studies advancing our knowledge of crystal/melt/gas partitioning [18-20].

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