



Cambro–Ordovician ‘Ikh Mongol Arc System’ – a key structure governing the crustal growth and Early Palaeozoic geodynamic evolution of the Mongolian Altai

Vojtěch Janoušek (1,2), Karel Schulmann (1), Igor Soejono (1,2), Yingde Jiang (3), David Buriánek (1), Pavel Hanžl (1), and Ondrej Lexa (2)

(1) Czech Geological Survey, Czech Republic (vojtech.janousek@geology.cz), (2) Institute of Petrology and Structural Geology, Charles University in Prague, Czech Republic, (3) State Key Laboratory of Isotope Geochemistry, Chinese Academy of Sciences, Guangzhou, China

A belt of Cambrian–Early Ordovician subduction-related magmatic complexes can be traced from Gobi and Mongolian Altai in the south to the south-western tip of the Siberian Craton in Russia [1–8]. It thus borders, together with Late Neoproterozoic passive margin (Lake Zone), the western, external part of the Mongolian orocline [9]. The spatial distribution, age patterns, petrology and whole-rock geochemistry (including the whole-rock Nd and in situ zircon Hf isotopes) indicate that most of these magmatic complexes once could have constituted parts of the same huge supra-subduction magmatic arc system of Pacific dimension. This newly established ‘Ikh-Mongol’ (= Great Mongolian) Arc System, exceeding 1,800 km in length, decorated the outer margin of a chain of Precambrian ribbon continents (Erguna, Baydrag, Zabkhan and Tuva-Mongolia). The main episode of magmatism therein took place between c. 530 and 490 Ma [8].

Our new data indicate that the character of subduction, and thus of the magma sources, could have changed dramatically along strike of this arc system. Depending on the exact position, it passed from a typical Andean-type continental arc, recycling the mature Palaeoproterozoic continental crust (e.g., Zamtyn Nuruu, southern Lake Zone: [7]), through a primitive continental arc developed on previously accreted, youthful (Tonian) arc crust (Khantaishir Magmatic Complex: central Lake Zone: [8]) to a typical intraoceanic arc intruding the Cambrian sedimentary accretionary wedge (Togtokhinshil Magmatic Complex, western Lake Zone: [6]).

The magmatism of the Ikh-Mongol Arc System heralded the onset of slab rollback-related extension and development of a giant Pacific-type accretionary sedimentary wedge in the forearc region, i.e. in the future Chinese, Mongolian and Russian Altai [10]. The main sources of sedimentary detritus were identified in the arc region and the northerly/easterly Precambrian continental ribbons [11–12]. We argue that the Cambro–Ordovician Ikh-Mongol Arc System magmatism, together with the related accretionary wedge formation, represented the most important crustal peri-Siberian growth event in the Tuva–Mongolian region of the Central Asian Orogenic Belt.

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