



Sedimentary record and provenance of the Lower Palaeozoic sequences in the Hovd Zone (western Mongolia): formation to thinning of the accretionary wedge in the Altai Domain

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Although the western Mongolia is one of the most investigated parts of the Central Asian Orogenic Belt, some fundamental issues such as duration of Palaeozoic arc magmatism, timing of sedimentary wedge formation and subduction polarity are still discussed. The study of the sedimentary successions gives useful possibility to resolve these questions. The new data on sedimentology and detrital zircon ages from the Lower Palaeozoic flysch sequences in the Hovd Zone, the easternmost section of the Mongolian Altai, constrain depositional age and source areas feeding the sedimentary system. Consequently, they allow us to clarify history of Altai accretionary wedge with regards to timing of the nearby magmatic-arc activity.

Sedimentological analysis has revealed two distinct types of sedimentation within the Hovd Zone. The lower part (Ordovician–earliest Silurian) of the studied succession shows dominantly volcano-sedimentary character interpreted as reflecting deposition in a proximal part of the sedimentary accretionary wedge of Pacific type. The upper part (Silurian–Late Devonian) of the profile has generally siliciclastic flysch-like nature and indicates a contrasting, platform-type depositional setting. This part of the succession is interpreted as related to the Silurian–Devonian lithospheric extension and thinning of the accretionary wedge-system.

Detrital zircon age populations of the studied formations uniformly show a minor peak at c. 390 Ma, a dominant Neoproterozoic–Ordovician age group at c. 560–460 Ma, a broad Neo- to Mesoproterozoic peak at c. 720–1050 Ma and several minor Meso- to Palaeoproterozoic age clusters. This age pattern is interpreted as a signal of detritus derived from the neighbouring Devonian granites and/or Neoproterozoic–Ordovician magmatic rocks of the intra-oceanic and the Andean-type arcs of the Ikh-Mongol Arc System in the Lake Zone. The Precambrian sources were identified as the basement in the Tuva–Mongolian continental ribbon further northeast.

The maximum sedimentary ages, determined by the youngest detrital zircons, shift the end of deposition at least to the latest Devonian and imply a considerably longer sedimentation than has been proposed so far. Nearly identical detrital zircon age spectra from the Lower Palaeozoic sequences of the Hovd Zone and other parts of the Altai Domain confirm the idea of a single giant accretionary complex developed along the entire outer margin of the Ikh-Mongol Arc System. The easterly located sources unequivocally support westward sedimentary transport indicating the east-dipping subduction. The switch of the sedimentary style suggests the latest Ordovician–earliest Silurian termination of magmatic-arc activity in the western Lake Zone area, marking the onset of significant extensional period and sedimentary recycling of the Altai accretionary wedge.