GEODYNAMICS & TECTONOPHYSICS

PUBLISHED BY THE INSTITUTE OF THE EARTH'S CRUST
SIBERIAN BRANCH OF RUSSIAN ACADEMY OF SCIENCES

2017 VOLUME 8 ISSUE 3 PAGES 461–463 ISSN 2078-502X

https://doi.org/10.5800/GT-2017-8-3-0262

Proceedings of the Second Russia–China International Meeting on the Central Asian Orogenic Belt (September 6–12, 2017, Irkutsk, Russia)

EARLY STAGE OF THE CENTRAL ASIAN OROGENIC BELT BUILDING: EVIDENCES FROM THE SOUTHERN SIBERIAN CRATON

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For citation: *Gladkochub D., Donskaya T., Zhang S., Pisarevsky S., Stanevich A., Mazukabzov A., Motova Z.*, 2017. Early stage of the Central Asian Orogenic Belt building: evidences from the southern Siberian craton. *Geodynamics & Tectonophysics* 8 (3), 461–463. doi:10.5800/GT-2017-8-3-0262.

The origin of the Central-Asian Orogenic Belt (CAOB), especially of its northern segment nearby the southern margin of the Siberian craton (SC) is directly related to development and closure of the Paleo-Asian Ocean (PAO). Signatures of early stages of the PAO evolution are recorded in the Late Precambrian sedimentary successions of the Sayan-Baikal-Patom Belt (SBPB) on the southern edge of SC. These successions are spread over 2000 km and can be traced along this edge from north-west (Sayan area) to south-east (Baikal area) and further to north-east (Patom area). Here we present the synthesis of all available and reliable LA-ICP-MS U-Pb geochronological studies of detrital zircons from these sedimentary successions.

The detrital zircon ages from lower parts of successions suggest the Siberian craton as the only provenance area right after the opening of the PAO in the passive-margin environment.

The absence of Mesoproterozoic detrital zircons in lower parts of these successions confirms the hypothesis of a gap in the global-scale activity within the southern part of SC in Mesoproterozoic [*Gladkochub et al., 2010*]. We suggest that this gap might be explained by intracontinental position of the southern part of SC

within internal part of the 'Transproterozoic supercraton' – a fragment of Mesoproterozoic supercontinent Nuna that did not disperse until the Neoproterozoic breakup of Rodinia.

The age constraints on the lower parts of Late Proterozoic successions in the Sayan segment of SBPB are provided by glacial deposits of the Oselok Group (Marna Formation) reported by *Sovetov and Komlev* [*2005*]. They correlated these tillites with the ~635 Ma Marinoan glaciation and consequently suggest the Vendian (Ediacaran) age for this group. *Sovetov et al*. [*2012*] correlate the horizon of tilloids in the lower part of the lowermost Goloustnaya Formation of the Baikal Group in the Baikal segment of SBPB with the abovementioned Marna Formation in the Sayan segment, and consequently also suggest their Ediacaran age. In a similar way *Chumakov et al.* [*2011*] suggest the ~635 Ma Marinoan age for the glacial deposits in the bottom of the Dzhemkukan Formation (Dal'naya Taiga Group in the Patom segment of SBPB). The studies of the $^{87}Sr/^{86}Sr$ ratio in the Dal'naya Taiga carbonates [*Pokrovskii et al., 2006*] also demonstrate their Ediacaran age.

Thus we suggest that the detaching of the southern flank of the Siberian craton from northern Laurentia [*Ernst et al., 2016*] and opening of the PAO between these cratons [*Cawood et al., 2016*] took place in Late Cryogenian – Early Ediacaran.

A sharp change in the age spectra of detrital zircons from younger SPBP sedimentary successions marks the next (developed) stage of the PAO evolution.

In particular, the youngest detrital zircon in the upper part of the Uda Formation in the Sayan segment SBPB is dated at 613±6 Ma. The youngest detrital zircons of the Uluntui and Katchergat formations in the Baikal segment have ages of 631±20 Ma and 630±22 Ma correspondingly [*Gladkochub et al., 2013*]. The age of the youngest detrital zircon from the Valukhta Formation in the Patom segment of SBPB is 610±10 Ma [*Powerman et al., 2015*]. These formations represent the lower layers of the foreland basin successions and are covered by upper strata of latest Ediacaran foreland basin sediments of similar rocktypes and with similar spectra of detrital zircon ages: Aisa Formation of the Sayan segment, Ushakovka Formation in the Baikal segment and Zherba Formation in the Patom segment of SBPB. All these formations are dominated by "non-Siberian" Neoproterozoic detrital zircons comparing to "Siberian" zircons with age peaks of ~2.5–2.7 Ga and ~1.85 Ga [*Gladkochub et al., 2013; Powerman et al., 2015*]. The abundance of Neoproterozoic zircons in the Uda Formation (Oselok Group, Sayan segment), Ushakovka Formation (Baikal segment) and Zhuya/Bodaibo Groups (Patom segment) might be due to the shrinkage of the ocean basin as a result of the convergence of the craton with the microcontinents and island arcs within the Paleo-Asian Ocean.

Consequently we suggest that a wide ocean existed along the southern margin of the Siberian craton only for ~25–30 my and at ~610 Ma it transformed to a series of foreland basins which mark early stage of a closure of this part of PAO. Its final closure occurred in Early Paleozoic by attaching microcontinents and relicts of island arcs to the southern margin of SC and resulted in a formation of the Baikal collisional belt [*Donskaya et al., 2000, 2017*], which could be considered as the earliest fragment of CAOB.

Acknowledgements. The study was supported by the Russian Foundation for Basic Research (grant #16-05-00642).

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