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Two different Neoproterozoic-Cambrian sedimentary basins of Dzabkhan continental block (Central Asian fold belt)

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The Dzabkhan terrane (Mongolia) is now located in the Central Asian Orogenic Belt, but it was originally a huge continental block in the Paleasian ocean. It comprises the Baydargin complex, with model ages (T_{DM}) of 3.2-3.1 Ga and the age of granulite metamorphism is 2.66 Ga (U-Pb method in zircons). Another part is Bumbuger complex with a model age of 3.1 Ga and age of granulite metamorphism of 2.36 Ga (U-Pb method in zircons) [1]. The Mezoproterozoic crystalline basement rocks are overlain by the Neoproterozoic Uldzitgol Formation. There was a carbonate sedimentation epoch in the Ediacaran-Cambrian on the shelf of the Dzabkhan block. Limestone and dolostone of Tsagaan Oloom and Bayan Gol formations were deposited in this period on volcanogenic rocks of the Dzabkhan Formation (age of this one is 805-770 Ma [2]).

It was considered that rocks of Tsagaan Oloom and Bayan Gol Formations were formed successively. These rocks are stratigraphically typical of Central Asia. We have studied the chemical and isotopic composition of terrigenous layers of Tsagaan Oloom and Bayan Gol formations, and have found the following. First, for whole rock chemical characteristics, the Tsagaan Oloom sandstones are more potassic, and the Bayan Gol sandstones are more sodic. Secondly, the Nd-isotopic compositions of both formations are very different. Values of ϵ_{Nd} of the Tsagaan Oloom Formation range from -6 to -11 and ϵ_{Nd} values of Bayan Gol Formation vary from +1.4 to +6.4. This and other chemical and mineralogical

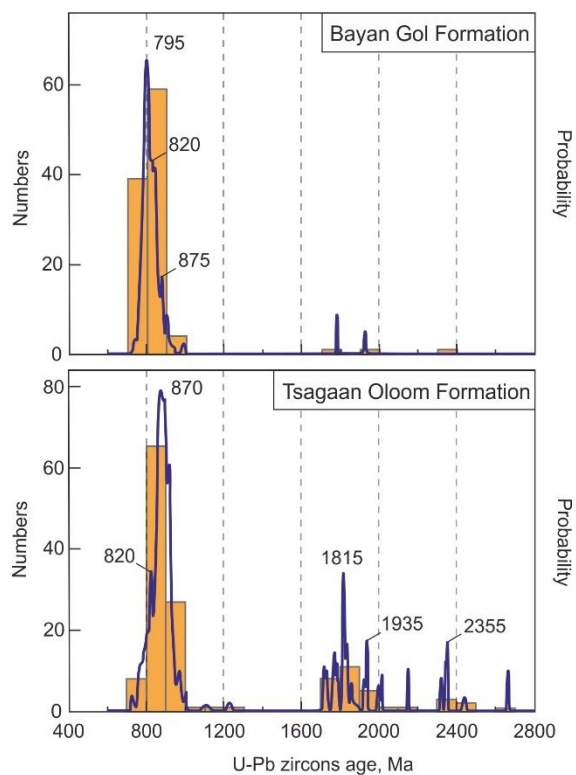


Figure 1: Distribution of U-Pb detrital zircons data

features indicate that Tsagaan Oloom terrigenous rocks were deposited by recycling of older sedimentary rocks, which, in turn, formed by erosion of ancient granite. Moreover, sandstones of the Bayan Gol Formation are products of erosion of different types of magmatic rocks, from andesite to granite. Thirdly, the distribution of U-Pb detrital zircon data from the Tsagaan Oloom sandstones and underlying tillite have two age peaks, at 2.7-1.8 Ga and 0.87-0.90 Ga, whereas one Bayan Gol Formation sandstone has only one peak (0.75-0.82 Ga), without ancient zircons.

We explain these differences as reflecting two different sedimentary basins. Deposits of Tsagaan Oloom Formation formed by erosion of terrigenous and ancient acid magmatic rocks and accumulated on rocks of Baydargin complex. Then, the Dzabkhan-Mandal block was joined to Baydargin block, without formation of sedimentary rocks. The Bayan Gol Formation overlies

deposits on both blocks, and it obviously accumulated in a different basin to the Tsagaan Oloom Formation.

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References:

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- [2] Levashova et al. (2010) *Tectonophysics* 485: 306-320

