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# When big river started to drain to Arctic Basin: view from the Sverdrup Well (Kara Sea)

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Sverdrup well is the only well drilled north of the Taimyr Peninsula, in a small island situated in the eastern Kara Sea. It was drilled above the North Siberian Arch (NSA) – which is assumed to be the continuation of Novaya Zemlya-Taimyr fold-and-thrust belt under Kara Sea. NSA divides the South Kara Basin (continuation of Mesozoic West Siberian Basin) and North Kara Basin (presumably part of Baltica continent) and is covered by relatively thin Meso-Cenozoic strata. Sverdrup well penetrated around 1500 m thick clastic Cretaceous and Upper Jurassic succession and reached the NSA basement.

Here we present results of U-Pb and U-Th-He detrital zircons (DZ) dating of 8 samples both from sedimentary cover and basement of NSA. Our data shows that the NSA basement is composed of slightly metamorphosed shales of presumably Permian age (based on the youngest cluster of Detrital Zircon). Based on the obtained U-Pb ages of DZ the samples from the Cretaceous-Upper Jurassic succession can be subdivided in two groups. The first group is characterized by numerous Mesoproterozoic zircons ranging in age between 1600-1000 Ma, Neoproterozoic zircons of 700-500 Ma and Carboniferous and Permian grains.

The dated sandstones are very immature, mainly lithic with numerous unstable grains pointing on short sediment transport pathways. Moreover, DZ data point that the main source of Upper Jurassic-lowermost Cretaceous clastics locates within neighboring Taimyr peninsula. The second group of samples (Aptian) has a striking difference in DZ age distribution and sedimentary petrography. Dated sandstones are quartz and arkosic arenites. Dated grains form several major peaks at 2700-2500, 1900-2000, 300-250 and 120-150 Ma. Precambrian grains indicate that the Siberian craton basement was a provenance area, whereas Mesozoic zircons likely have their source along the southern margin of Siberia (modern coordinates). Moreover U-Th-He and U-Pb double dating of zircons showed that the main cooling and uplift within provenance of the first group of samples occurred in Permian, whilst for the second group of sample the cooling and uplift is dated as Late Jurassic- Early Cretaceous.

The documented variation in U-Pb and U-Th-He characteristics of DZ from the studied succession most likely reflect changes in the river systems that transported clastic sediments from provenance to sedimentary basin. Thus, we propose that big Siberian rivers started to evolve and carry clastic grains from the far located Siberian craton margins to Arctic Ocean since the Aptian time.

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