



De Long Islands: sedimentary history and provenance

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The De Long Islands are an archipelago located in the East Siberian Sea, represent one of the few exposures of the Neoproterozoic and Early Paleozoic rocks in this part of the Arctic Ocean, and therefore are a very important area for study. It consists of 5 islands: Jeannette, Henrietta, Bennett, Vil'kitsky and Zhokhov. Vil'kitsky and Zhokhov Islands are covered by Cenozoic basalts, therefore are not considered here, whilst the Paleozoic rocks of interest for this study outcrop on Jeannette, Henrietta and Bennett islands. Jeannette Island is the smallest, containing exposures of a highly deformed and tectonized sedimentary succession. This succession is represented by siltstones and argillites, with beds of gravel to cobble conglomerates. The defining characteristic of these deposits is the abundance of tuffaceous beds, along with volcanic pebbles within the conglomerates. On Henrietta Island, four different units have been identified. The oldest one is very similar to the rocks which outcrop across Jeannette Island. The second unit consists of sandstones with lenses and layers of polymictic conglomerates. The third unit is represented by red-colored sandstones, whilst the youngest unit comprises basalt flows of an assumed Middle Paleozoic age. Accordingly detrital zircons data the age of sedimentary succession of Henrietta and Jeannette islands is the Neoproterozoic. On Bennett Island, Cambrian and Ordovician strata mainly consist of carbonates with minor interbedded clastics. We determined U-Pb ages for detrital zircons from 4 samples, from Jeannette and Henrietta Islands. Three samples have similar age populations, although there are some variations in the abundance of each population. The samples are dominated by Neoproterozoic and Mesoproterozoic grains with distinct peaks at ca. 550, 660, 1000, 1150, 1450, 1665 Ma. The youngest sedimentary unit on Henrietta Island has a very different detrital zircon distribution. The 550 Ma zircon population prevails (60%), with additional smaller peaks are at 1190 Ma and 1695 Ma. The detrital zircons from two samples collected from the Lower Paleozoic interbedded clastic rocks of Bennett Island have been dated. The zircon age distributions are very similar to those from Jeannette and Henrietta islands. The spectrum of detrital zircons indicates that clastic detritus was derived from multiple sources, including the Grenvillian and Sveconorwegian orogens, as well as a Neoproterozoic ca. 570-550 orogen (Timanian?).

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