

The Tectonic Unity and Boundaries of the New Siberian Islands Terrane (Eastern Arctic) Based on Geological and Paleomagnetic Data

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ABSTRACT

The New Siberian Islands (Lyakhovsky, Anjou and De Long island groups) and the adjacent continental shelf are parts of a large terrane. This is substantiated by new paleomagnetic and paleontological data [Metelkin et al., 2016, Gondwana Research] for Ordovician and Silurian carbonate rocks of Kotelny Island (Anjou group), and for Ordovician turbidities of Bennett Island (De Long group) that indicate a biogeographic similarity between the shelves of the Siberian paleocontinent and the NSI in the early Paleozoic. Three new paleomagnetic poles for these rocks (48.9°N, 13.8°E, A95 = 18.1° for 475 Ma; 45.5°N, 31.9°E, A95 = 11.0° for 465 Ma, and 33.7°N, 55.7°E, A95 = 5.1° for 435 Ma) have been calculated. We have also obtained additional paleomagnetic poles, supported by Ar-Ar dating, for De Long rocks: dolerite dikes intruding late Precambrian volcanogenic-sedimentary rocks of Jeannette Island (49.2°N, 357.4°E, A95 = 5.9 for 480 Ma) and for basalts of Henrietta Island (23.7°N, 45.7°E, A95 = 3.2° for 520 Ma). The similarity of paleomagnetic poles for Kotelny, Bennet and Jeannette islands confirms that the structures of both the Anjou and De Long island groups belong to the same terrane at least from the early Ordovician. The calculated paleolatitudes for all poles do not exceed 40° and correspond to a subtropical region. The calculated apparent polar wander path for the sampled rocks changes abruptly in the early Ordovician, which can indicate a significant tectonic event also recorded in our published Ar-Ar isotopic data. This APWP shows that the NSI terrane drifted independently and could not have been part of Laurentia, Baltica, Kara or Siberia. On the other hand, it could have been involved in the tectonic evolution of the Kolyma-Omolon superterrane near Siberia together with the Omulevka, Prikolyma, and probably Omolon terranes. These conclusions in addition to the geology of the region and the tectonic affinity of the NSI terrane with the Verkhoyansk-Kolyma structures leads us to propose that it is framed from the Alaska-Chukotka terrane by the continuation of the South Anyui suture to the east of the De Long Islands and that its western boundary is probably a continuation of the Kolyma Loop suture to the west of the Lyakhovsky Islands.