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Two possibilities for New Siberian Islands terrane tectonic history during the Early Paleozoic based on paleomagnetic data

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The New Siberian Islands (NSI), located in the East Siberian Sea in the junction region of various structural elements, are a key target for deciphering the tectonic evolution of the Eastern Arctic. In recent years, we went on several expeditions and gathered an extensive geological material for this territory. Among other things, we could prove that the basement of the De Long and Anjou archipelagos structures is Precambrian and the overlying Paleozoic sections formed within the same terrane. The form of the boundaries of the NSI terrane are actively debated and are probably continued from the Lyakhovsky islands in the south-west to the southern parts of the submerged Mendeleev Ridge, for which there is increasing evidence of continental crust. Today there are several models that interpret the Paleozoic-Mesozoic tectonic history and structural affiliation of the NSI terrane. Some propose that the Paleozoic sedimentary section formed in a passive margin setting of the Siberian paleocontinent. Others compare its history with marginal basins of the Baltica and Laurentia continents or consider the NSI terrane as an element of the Chukotka-Alaska microplate. These models are mainly based on results of paleobiogeographical and lithological-facies analyses, including explanations of probable sources for detrital zircons. Our paleomagnetic research on sedimentary, volcanogenic-sedimentary and igneous rocks of the Anjou (Kotelny and Bel'kovsky islands) and De Long (Bennett, Jeannette and Henrietta islands) archipelagos let us calculate an apparent polar wander path for the early Paleozoic interval of geological history, which allows us to conclude that the NSI terrane could not have been a part of the continental plates listed above, but rather had active tectonic boundaries with them. Our paleomagnetic data indicate that the NSI terrane drifted slowly and steadily in the tropical and subtropical regions no higher than 40 degrees. However, the main uncertainty for the tectonic interpretation of these data is related to not knowing the true polarity and therefore the geographic hemisphere in which the terrane was located during the recording of the paleomagnetic signal. Consequently, we presented two possible tectonic histories for the Paleozoic of the NSI terrane, calculated and discussed the appropriate global reconstructions describing the paleogeography as well as probable mutual position and drift kinematics of the Eastern Arctic terranes.
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