Paleomagnetic Study of Mesozoic Sediments of the New Siberian Islands: Remagnetization Caused by Collision With Siberia?

Anna I. Chernova[1], Dmitry V. Metelkin[1], Valery A. Vernikovsky[1], Nikolay Y. Matushkin[1]

[1]Novosibirsk State University, Novosibirsk, Russian Federation.

ABSTRACT

The New Siberian Islands (NSI) terrane is a large tectonic structure with a Precambrian basement and a Phanerozoic sedimentary cover which is exposed on the several groups of archipelagoes in the East Siberian and Laptev Seas. Its Paleozoic and Mesozoic tectonic history is actively discussed in the scientific community. Thus, there are still some debates about the relationships of some continental blocks during the Verkhoyansk-Chukotka orogenic area forming (Kolyma-Omolon, NSI and Chukotka-Alaska terranes, Siberia) and, consequently, about the continuation of the South Anyui suture on the Arctic shelf and Amerasian basin opening scenarios. According to most opinions this suture presents a main tectonic boundary between the Alaska-Chukotka and NSI terranes (or one composite terrane?) and the Eurasia, and its age is defined as Late Jurassic – Early Cretaceous. During field trips to the NSI in 2011 the Upper Jurassic – Lower Cretaceous clastic sediments of Stolbovoy Is. and Great Lyakhovsky Is. were sampled for paleomagnetic study. These rocks are believed to have accumulated in the foretrough during the Anyui orogeny. Also, Triassic siltstones from the Kotelny Is. were tested. The regular paleomagnetic directions for these sites were obtained by stepwise demagnetization and Zijderveld diagrams analysis. The synchronicity of determined magnetization and rock formation was verified by fold test which was appeared to be negative, indicating a post-folding age of this magnetization. To estimate the age of the expected remagnetization we compared the poles calculated from directions in geographic coordinates with the Mesozoic interval of the Siberian APWP. It revealed that the obtained NSI terrane poles match with its 140-80 Ma interval within the error limits and the age of remagnetization increases to the south of archipelago. Studied sites are located close to the southern and western boundary of NSI terrane. The previous studies of Lower Paleozoic rocks sampled away from a boundary proved the preservation of primary magnetization. So we can assume that this remagnetization of sediments of the NSI terrane is local and took place mostly along its southwestern boundary. It is synchronous with the end of accretion-collisional processes associated with the attaching of the NSI terrane to Siberia. The different age of remagnetization in various parts of the archipelago can be explained by anticlockwise rotation of the terrane relatively to Siberia.