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Paleomagnetism of rocks of the Okhotsk-Chukotka volcanic-plutonic belt of the Krest Bay (Chukotka): questions and tasks

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Paleomagnetic studies provide information about both the paleolatitude of the studied geological bodies and the polarity of the geomagnetic field during their formation. Therefore, conducting paleomagnetic studies in Northeast Eurasia, particularly the Chukotka Peninsula, is necessary to decipher the tectonic history of the region. This, in turn, helps solve various tasks related to the search for mineral deposits in the region and the adjacent Arctic shelf.

It is widely accepted that the volcanic rocks of the Okhotsk-Chukotka Volcano-Plutonic Belt (OCVB) formed after tectonic activity in the Verkhoyansk-Chukotka region [1]. However, there are rare records of deformations and strike-slip faults within the OCVB structure [2]. Some paleomagnetic studies show discrepancies in the obtained poles compared to the expected ones, considering the hypothesis of Eurasia's rigidity at the end of the Mesozoic-Cenozoic era [3]. To accurately assess possible rotations of blocks in the OCVB, paleomagnetic data from the OCVB eastern sector are necessary.

For this research, the Krest Bay area was chosen due to its abundant tuff-lava rocks of the Nyrvakinot suite (88.1±1.2 Ma) [4]. The accessibility of the sampling location, modern age assessment, and thickness of well exposed sections make it promising for paleomagnetic studies. The area consists of sedimentary, volcanic-sedimentary, and volcanic rocks mainly of andesitic composition in the Olkhovka formation, overlying the Nyrvakinot and Amga suites. The entire section is intruded by a large number of thin basic dikes and granite bodies of various sizes and undefined ages.

During two field seasons, two powerful sections of the Nyrvakinot suite were sampled in the area of Matachingai mountain and Egvekinot town. Samples were also taken from the largest Iskaten granite massif, located 10-20 km from the sampled Nyrvakinot sections, and from three basaltic dykes intersecting the sampled sections. Additionally, samples were taken for limited conglomerate testing from tuff-conglomerate layers.

Over 800 samples were studied from the Nyrvakinot suite, with demagnetization conducted using temperature and alternating field methods. Despite the Cretaceous normal polarity superchron, predominantly reverse polarity magnetization was recorded in the Egvekinot area, while normal polarity magnetization was found in the Matachingai section of rocks from the same age. The report will present detailed results of paleomagnetic studies in the Krest Bay area, discussing the complex paleomagnetic record, reliability tests, and assessments of primary magnetization.

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References:

[1] Miller, E. L., Meisling, K. E., Akinin, V. V., Brumley, K., Coakley, B. J., Gottlieb, E. S., ... & Toro, J Geological Society. London. 2018. V. 460. P.57-120.

[2] Filatova N. I. Perioceanic volcanic belts. – Nedra, 1988 (in Russian).

[3] Lebedev, I. E., Tikhomirov, P. L., Pasenko, A. M., Eid, B., Lhuillier, F., Pavlov, V. E. Izvestiya, Physics of the Solid Earth. – 2021. – T. 57. – C. 232-246.

[4] Tikhomirov, P. L., Kalinina, E. A., Moriguti, T., Makishima, A., Kobayashi, K., Cherepanova, I. Y., & Nakamura, E //Journal of Volcanology and Geothermal Research. 2012. V.221–222. P.14–32.