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Evolution of the Makarov Basin on the basis of geohistorical analysis of magnetic anomalies and its relationship with the evolution of the Alpha Ridge

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The southeast-northwest oriented spreading type magnetic anomalies M30r - M5n, 157.5 - 127.5 Ma B.P. and an extinct spreading center (SC) – SC “Podvodnikov”, at the oceanic basement rise near 83.5˚N have been revealed in the Makarov Basin on the basis of geohistorical analysis of magnetic anomalies. The kinematic characteristics of the oceanic floor movement are determined. Finite Euler pole of the lithospheric plates rotation for the epoch of magnetic anomaly M30r, 157.5 Ma ago, was at the northern end of the Mackenzie Fold Belt. Poles for the epochs of magnetic anomalies M23r, M17r and M14r, 151.5, 141.7 and 136.5 Ma ago, correspondingly, were in the area of the Mackenzie Delta. Spreading was symmetrical and slow and from 136.5 Ma ago ultraslow. The oceanic floor was limited by transform faults from the east and from the west. Lithospheric microplates Podvodnikov (to the south from SC) and Makarov (to the north from SC) were moving along these faults. The western transform fault separated the oceanic Makarov Basin from the continental Rassian part of the Lomonosov Ridge. At least the northern part of the eastern transform fault during the Late Mesozoic was in the oceanic crust. The southern continental margin of the Podvodnikov Basin was passive. The southern boundary of the Podvodnikov microplate presumably coincided with the Island arc in which the South Anyui Ocean was subducted.

Spreading in the Makarov Basin happened simultaneously with the South Anyui

Ocean closure and had a tectonic connection with its closing as the Late Mesozoic tectonics of the East Siberian shelf had.

Joint plate tectonic reconstructions of the Makarov Basin and the Alpha Ridge area allowed to recognize two stages of the evolution of this part of the Amerasian Basin.

During the first stage of the evolution, from slightly earlier 157.5 to 151.5 Ma ago two SC existed in the studied area of the Amerasian Basin:

1 - "South-Eastern", conjugate passive continental margins of the Polar and Canadian parts of the Lomonosov Ridge and of the Sverdrup Basin moved away owing to the opening of the oceanic floor from its axis;

2 - Podvodnikov, the formation of the Makarov Basin began at this SC and in consequence the De Long High moved to the south along the transform continental margin of the Rassian part of the Lomonosov Ridge.

During the second stage of the evolution, from 151.5 Ma ago the position of the Euler poles of the Makarov Basin floor rotation changed. "South-Eastern" SC divided for two SC: Southern and Eastern, with different orientation. As a result the Western SC was formed. It cut off and moved to the north the area of the oceanic crust that had been formed at the Southern SC. A displacement to the north of the Polar and Canadian passive continental margins of the Lomonosov Ridge became the effect of the ocean floor spreading from the Western SC and Eastern SC. At the end of this displacement the southwestern tip of the Polar margin of the Lomonosov Ridge was joining with the northern end of the western transform fault. Separate parts of the continental margins of the Lomonosov Ridge: the passive Polar and Canadian and the transform Russian, became a single margin in consequence of this evolution.

Later the week zones in the oceanic crust underwent to intraplate volcano-tectonic activity that created the Alpha Ridge and two Rises in the Makarov Basin.

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