



## **Evolution of the southern Canada basin, the Arctic ocean, on the basis of geohistorical analysis of magnetic anomalies**

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The geohistorical analysis of the magnetic anomalies of the Southern Canada Basin has been fulfilled using the original method, that showed good results when the Alpha Ridge was studied. The evolution of the Basin has been revealed by this analysis.

The presence of fan-shaped magnetic anomalies in the Southern Canada Basin is known since the seventeenth years. P. Taylor and his colleagues were the first who supposed that these anomalies are spreading-type anomalies M25 - M12 from 153 to 127 Ma old and defined the spreading center at 143°W. However gravity minimum from satellite altimeter data showed that extinct spreading center is 75 km to the east [Laxon, McAdoo, 1998]; the new Russian and US Navy digital magnetic anomaly model of the Arctic Ocean [Glebovsky, Kovacs et al., 2000] allows to find that north-eastward trending magnetic anomalies join the fan-shaped magnetic anomalies from the east and from the west. Such character of the magnetic anomalies testifies about two stages of the evolution. The results of geohistorical analysis confirmed that conclusion.

According the results of geohistorical analysis the Southern Canada Basin was formed from Tithonian through Hauterivian, from slightly earlier 148 to 127.5 Ma ago, due the opening of the ocean basin from two spreading center that were active successively.

Plate tectonic reconstructions have shown that the Chukchi Borderland was near the Banks island - Mackenzie Delta before the beginning of the spreading in the Late Jurassic.

During the first stage of the evolution, from slightly earlier 148 to 141 Ma ago, the

spreading rate was fast. The spreading center extended to northeastward, subparallel to the margins of the Banks Island - Mackenzie Delta and Chukchi Borderland and perpendicular to the margin of the Arctic Alaska. The Euler pole of rotation propagated to the northeastward quickly, from the area westward from the Banks Island central part to the Prince Patrick Island northern part, near the boundary between Sverdrup Basin (the area of crustal stretching) and Franklinian mobile belt (the area of crustal compression). The spreading center propagated northeastward too. The opening of the Southern Canada Basin during the first stage took place simultaneously with the formation of the oceanic crust from three spreading centers in the area of the Alpha Ridge and adjacent part of the Canada Basin. The oceanic crust of the southern Canada Basin was separated from the oceanic crust of the northern Canada Basin by the area of the continental crust that was shortening as the spreading center was propagating. Spreading ceased in the area of the Alpha Ridge and adjacent part of the Canada Basin, the spreading center jumped and fan-shaped spreading began in the southern Canada Basin when oceanic crust of the southern Canada Basin reached the oceanic crust of the northern Canada Basin, 140 Ma ago.

Spreading in the southern Canada Basin was slow in the beginning of the second stage then ultraslow since 132 Ma ago and ceased 127,5 Ma ago. The spreading center was submeridional. The Euler poles of rotation occurred in the south, in north-eastern part of the Brooks Range (the area of crustal compression).

During the first stage conjugates margins of the Banks Island - Mackenzie Delta and Chukchi Borderland were passive. The margin of the Arctic Alaska was transform and Chukchi Borderland moved along it. During the second stage, 141 - 127.5 Ma ago, all margins became passive and Chukchi Borderland and Arctic Alaska rotated 22° counterclockwise that corresponds to paleomagnetic analysis of Lower Cretaceous strata in test wells [Halgedahl, Jarrard, 1987].

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