



Examination of Jan-Mayen and Elan microcontinents formation conditions based on analogue modeling.

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There are many isolated blocks of continental crust within oceanic crust. In this study we will consider on the Elan Bank and the Jan Mayen ridge. Both these structures formed through complex history of rifts propagation.

Elan Bank was formed by ridge jumping during the breakup of India and Antarctica in later Albian (117-118 Ma). Elan Bank was transferred from the Indian to the Antarctic plate via a ridge jump. The role of hot spot is unclear – probably it was the cause of ridge jumping. Thus Elan Bank is isolated block of continental crust, which was consequently accompanied by close eruption of LIP Kerguelen.

Jan Mayen Ridge formed via ridge jumping into Greenlandian margin. Aegir Ridge between Europe and Greenland/Jan Mayen margins was active between chron C24 b (~55 Ma) to chron C7 (~24.7 Ma). Next step was the probable weakening of Greenlandian lithosphere by hot-spot and Kolbensei spreading ridge formation which is active since 23.5-22 Ma (chron C6) to nowadays. From others studies we know that Jan Mayen microcontinental block was rotating between anomalies C13 (33.5-33.0 Ma) and 5D (17.6-17.2 Ma).

In laboratory of analogue modeling we held series of experiments dedicated to study of rifts propagation. Aim of our modeling was to study main parameters of microcontinents formation during rifting and initial spreading processes.

In our model we suggest formation of these two microcontinents due to overlapping of counter rifts. Researching certain model parameters allow us to suggest that microcontinents formation happens when: (1) propagation of counter fissures is symmetrical and simultaneous; (2) initial rifts are shifted from each other on 1,5-3 cm; (3) heterogeneities in model plate (hard block parallel to extension) reduce the probability of microcontinent formation; (4) during the extension and accretion of new “oceanic” crust microcontinent undergoes rotation in horizontal and vertical planes.

From our experiments we can preliminary conclude that formation of microcontinents is quiet regularly – it is the natural behavior of two opposite rifts propagation.