



Geometrical constraints of rift fissures on the formation of isolated micro continental blocks during transition from continental rifting to oceanic spreading based on analogue modelling

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From global ocean bathymetric data, we can observe many intraplate features such as submerged and non-submerged plateaus below sea level, islands, ridges, banks etc. All these features can be divided in three main groups: (1) blocks with oceanic crust; (2) blocks with continental crust; (3) complex features. There are many hypotheses that try to describe their origin. Hypotheses, which we carried on: (1) features with continental crust formed by ridge jumping into a continental margin; (2) features with igneous composition formed by eruption of huge volumes of volcanic rocks; (3) complex features with jigsaw crust composition.

We present preliminary results of our experimental modeling that show geometrical constraints for the formation of isolated blocks in oceanic crust due to the evolution of overlapping spreading centers. These can lead to the formation of an isolated continental block if all following conditions are met: (1) the angle between extension direction and pre-existing fractures are between 45° to 60° ; (2) the length of two pre-existing fractures located on opposite sides of model plate is equal; (3) the offset between two pre-existing fractures located on opposite sides of model plate vary from 1.5 cm to 3 cm. Extension rates in the model vary from $V = 1.67 \cdot 10^{-5}$ m/sec to $V = 2.15 \cdot 10^{-5}$ m/sec which correlate with slow spreading rates. The model plate size was 12×25 cm.

These experiments provide us with a probable mechanism of isolated continental block formation. In addition, the experiments allow us to distinguish major geometrical parameters of continental break up modelling. These results are preliminary and we will study other experimental settings such as influence of hotspot activity, interaction between propagating ridge and weakened zones and zones with more stable properties.

For example, we consider the conditions of formation Elan Bank in Kerguelen Plateau structure.