Building and breaking a Large Igneous Province: An example from the High Arctic

The genesis of the Amerasia Basin in the Arctic Ocean has been difficult to discern due to overprint of the Cretaceous High-Arctic Large Igneous Province (HALIP). Based on detailed analysis of bathymetry data, new Arctic magnetic and gravity compilations, and recently published radiometric and seismic data, we present a revised plate kinematic model of the northernmost Amerasia Basin. We show that the smaller Makarov Basin is formed by rifting and seafloor spreading during the latest Cretaceous (to middle Paleocene). The opening progressively migrated into the Alpha Ridge structure, which was the focus of Early-to-Middle Cretaceous HALIP formation, causing breakup of the proto-Alpha Ridge into the present-day Alpha Ridge and Alpha Ridge West Plateau. We propose that breakup of the Makarov Basin was triggered by extension between the North America and Eurasian plates and possibly North Pacific plate rollback.

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