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

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The genesis of the Amerasia Basin in the Arctic Ocean remains largely unsettled due to overprint of the Cretaceous High-Arctic Large Igneous Province (HALIP). Based on detailed analysis of bathymetry data, new 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 formed by rifting and sea-floor spreading during the Late Cretaceous (to early Paleocene). The opening progressively migrated into the elevated Alpha Ridge structure, which was the focus of Early-to-mid Cretaceous HALIP formation, causing breakup of the HALIP by separation 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.