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Relative and Absolute Plate Motions, Mantle Plumes and Volcanism in the Arctic region

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Seafloor spreading in the North Atlantic ocean from Mesozoic until present day involved relative motion between three major tectonic plates: North America, Greenland and Eurasia and a number of microplates. Relative motions between these tectonic plates and movement of northern Pacific terranes since the Jurassic led to the development of the Arctic region as we know it today.
Studying the connection between the two realms involve good knowledge of the development of the North Atlantic and Arctic margins and oceanic basins and ideally, model uncertainties. Here we review the kinematics of North Atlantic and asses the implications of different models for locating the plate boundaries in the Arctic. One set of models implies extension before opening of the Eurasia basin and we postulate that this was accommodated in the proximity of Alpha- Mendeleev Ridge.

The origin of (mainly) Cretaceous large igneous activity in the central Arctic (the Alpha Mendeleev Ridge) and in the proximity of rifted margins, the so-called HALIP, is still debated. New models of global plate circuits and the connection with deep mantle are used to re-evaluate a possible link between the Arctic volcanism and mantle plumes.