EGU21-13797
https://doi.org/10.5194/egusphere-egu21-13797
EGU General Assembly 2021

Icelandia

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The NE Atlantic formed by complex, piecemeal breakup of Pangea in an environment of structural complexity. North of the present-day latitude of Iceland the ocean opened by southward propagation of the Aegir ridge. South of the present-day latitude of Iceland breakup occurred along the proto-Reykjanes ridge which formed laterally offset by ~ 100 km from the Aegir ridge to the north. Neither of these new breakup axes were able to propagate across the east-westerly striking Caledonian frontal thrust region which formed a strong barrier ~ 400 km wide. As a result, while sea-floor spreading widened the NE Atlantic, the Caledonian front region could only keep pace by diffuse stretching of the continental crust, which formed the aseismic Greenland-Iceland-Faroe ridge. The magmatic rate there was similar to that of the ridges to the north and south and so the stretched continental crust is now blanketed by thick mafic flows and intrusions. The NE Atlantic also contains a magma-inflated microcontinent – the Jan Mayen Microplate Complex, and an unknown but probably large amount of stretched continental crust blanketed by seaward-dipping reflectors in the passive margins of Norway and Greenland. The NE Atlantic thus contains voluminous continental crust in diverse forms and settings. If even a small portion of the sunken continental material contiguous with the Greenland-Iceland-Faroe ridge is included the area exceeds a million square kilometers, an arbitrary threshold suggested to designate a sunken continent. We have called this region Icelandia. The conditions and processes that funneled large quantities of continental crust into the NE Atlantic ocean are common elsewhere. This includes much of the North and South Atlantic oceans including both the seaboards and the deep oceans. Nor are such processes and outcomes confined to oceans bordered by passive margins. They are also found around the Pacific rims where subduction is in progress. Indeed, these conditions and processes likely are generic to essentially all the world's oceans and are potentially also informed by observations from intracontinental extensional regions and land-locked seas.