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TITLE: The Flemish Cap - Goban Spur conjugate margins: New evidence of asymmetry.

PRESENTATION TYPE: Poster Requested

CURRENT SECTION/FOCUS GROUP: Tectonophysics (T)

CURRENT SESSION: T43. Rift-to-drift Geology of the Atlantic: Insights from the US East-coast

AUTHORS (FIRST NAME, LAST NAME): Joanna Gerlings[1], Keith E Louden[2], Timothy A Minshull[3], Mladen R Nedimović[1]

INSTITUTIONS (ALL): 1. Department of Earth Sciences, Dalhousie University, Halifax, NS, Canada.
2. Department of Oceanography, Dalhousie University, Halifax, NS, Canada.
3. National Oceanography Centre Southampton, University of Southampton, Southampton, United Kingdom.

Title of Team:

SPONSOR NAME: Joanna Gerlings

ABSTRACT BODY: The combined results of deep multichannel seismic (MCS) and refraction/wide-angle reflection seismic (R/WAR) profiles across the Flemish Cap-Goban Spur conjugate margin pair will be presented to help constrain rifting and breakup processes. Both profiles cross magnetic anomaly 34 and extend into oceanic crust, which makes it possible to observe the complete extensional history from continental rifting through the formation of initial oceanic crust. Kirchhoff poststack time and prestack time and depth migration images of the Flemish Cap MCS data are produced using a velocity model constructed from the MCS and R/WAR data. These new images show improved continuity of the Moho under the thick continental crust of Flemish Cap. The basement morphology image is sharper and reflections observed in the thin crust of the transition zone are more coherent. A basement high at the seaward-most end of the transition zone now displays clear diapiric features. To compare the two margins, the existing migrated MCS data across Goban Spur has been time-to-depth converted using the R/WAR velocity model of the margin. These reimaged seismic profiles demonstrate asymmetries in continental rifting and breakup with a complex transition to oceanic spreading: (1) During initial phases of rifting, the Flemish Cap margin displays a sharper necking profile than that of the Goban Spur margin. (2) Within the ocean-continent-transition zone, constraints from S-wave velocities on both margins indentifies previously interpreted oceanic crust as thinned continental crust offshore Flemish Cap in contrast with primarily serpentinized mantle offshore Goban Spur. (3) Continental breakup and initial seafloor spreading occur in a complex, asymmetric manner where the initial ~50 km of oceanic crust appears different on the two margins. Offshore Flemish Cap, both R/WAR and MCS results indicate a sharp boundary immediately seaward of a ridge feature, where the basement morphology becomes typical of slow seafloor spreading. There are no significant changes in either reflectivity or velocity seaward toward magnetic anomaly 34. On the Goban Spur margin in marked contrast, the basement morphology landward of magnetic anomaly 34 is shallower and has lower relief, and the velocity model indicates a diffuse change between the transitional crust and seafloor spreading. The results from these two very different conjugate margins emphasize the importance of having both types of seismic data from both conjugate margins when interpreting the geodynamic processes.

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INDEX TERMS: [8105] TECTONOPHYSICS / Continental margins: divergent, [8109] TECTONOPHYSICS / Continental tectonics: extensional, [3025] MARINE GEOLOGY AND GEOPHYSICS / Marine seismics, [9325] GEOGRAPHIC LOCATION / Atlantic Ocean.
