

Distance (km)

## Supplementary material:

The figure shows the multichannel seismic depth profiles of Flemish Cap (Line 85-3, Line 87-3) and Goban Spur (WAM Line). We have reprocessed Line 85-3 with FOCUS 5.4 starting from the raw field tapes. Processing flowchart is shown in the tables 1 below. Line 87-3 was processed by Western Geophysical in 1988. Full details of processing applied are given in Western Geophysical (1988). The WAM Line was processed by Seismograph Services, Ltd (SSL). Full details are given in Klemperer (1989). Poststack time migration at 1.48 km s<sup>-1</sup> was done by Bullock and Minshull (2005). We have time-to-depth converted the three time migrated profiles using SeisWide 5.9 and the velocity models derived from the wide-angle data. The lower two sections are identical to Figure 3 in the paper, except the sections have no vertical exaggeration. The sections have the multichannel seismic data superimposed on the velocity models (Bullock and Minshull, 2005 and Gerlings et al., 2011). Layer boundaries of the velocity model are indicated by white lines. The velocity model of Bullock and Minshull (2005), which deviates by up to 8 km from the WAM profile (Figure 1), has been modified to better fit the seabed, basement and sedimentary layer boundaries. The upper two sections show the multichannel seismic profiles with no vertical exaggeration. The middle section is a close-up of the basement feature of Line 85-3 showing tilted fault blocks overlain by a (syn-rift?) sediment package (light blue).

## Table 1. Reprocessing of Line 85-3:

SEGD to SEGY	Noise attenuation
Edit duplicated shots	Multiple removal, Radon
Nominal geometry, CMP binning 12.5 m	Velocity analysis
Edit shot gathers	Stack
Spherical divergence	AGC
Surface consistence amplitude balancing	Kirchhoff time migration
Noise attenuation on low frequencies (0-12 Hz)	Coherency filter
Surface consistence deconvolution	Bandpass filter (0-5-70-80 Hz)
(preliminary velocity analysis combined with	Water bottom mute
velocity model of wide-angle seismic data)	

## **References:**

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- Gerlings, J., Louden, K.E. and Jackson, J.R., 2011, Crustal structure of the Flemish Cap Continental Margin (Eastern Canada): An analysis of a seismic refraction profile, Geophysical Journal International, v. 185, p. 30-48.

- Klemperer, S.L., 1989, Processing BIRPS deep seismic reflection data: a tutorial review, In: Cassinis, R., Nolet, G. & Panza, G.F. (eds) Digital Seismology and Fine Modelling of the Lithosphere, Ettore Majorana International Science Series, Physical Sciences, Plenum Press, New York, v.42, p. 229-257
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