

# ***Interactive comment on “Uncertainties in breakup markers along the Iberia-Newfoundland margins illustrated by new seismic data” by Annabel Causer et al.***

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The manuscript "Uncertainties in breakup markers along the Iberia-Newfoundland margins illustrated by new seismic data" by Annabel Causer, Lucía Pérez-Díaz, Jürgen Adam and Graeme Eagles present unpublished seismic data from the Southern Newfoundland Basin to study the impact of commonly used break-up markers for plate cinematic reconstructions of the initial ocean opening between the West Iberia and Newfoundland margins. The main conclusion is that in this region the "traditional" break-up markers do not allow to unequivocally discriminate the validity of the different plate tectonic rotational poles proposed in literature. From this the authors propose

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that new and better constrained reconstruction are needed to identify individual seismic profiles as parts of conjugate pairs.

It is a bit unsatisfactory that the main conclusion of this manuscript is that it is not possible to better constrain the opening using the data presented. A better constraint on the error of the different reconstructions could probably be done using the work of Hellinger, 1981 or Chang, Royer et al., 1991. A tool using these approaches is available in the free Gplates software (<https://www.gplates.org/user-manual/HellingerTool.html>).

In my opinion, the manuscript is missing some information. It would be nice to know which software has been used for the plate cinematic reconstructions and for data processing. A short description of the seismic data processing, even if done by TGS would be of interest.

The discussion should be extended to give at least an impression of comparable margins. Is this uncertainty a general problem or only in this specific region, which has nonetheless been very extensively investigated ? If only here, than why, for example are the magnetic anomalies especially unclear and uninterpretable or is this due to the large extend of serpentinised mantle material ?

The manuscript has no acknowledgement section, but probably some free software ("Generic mapping tools" or other) were used and should be acknowledged.

Figures: Figure 1: it would be nice to add the magnetic anomaly positions. Figs 5, 6, 7: all panels should be annotated a,b,c,d,e and explained in the legend. I think a classical offset and time annotation would be helpful, rather than just having a scale for one second and 10km. Middle panel have no indication for 0 s. Figure 9: strictly speaking there are no data shown in this figure, but mentioned in the caption.

Some smaller corrections : L. 82 Furthermore -> Furthermore we L. 94 missing ") L. 104 "(" too much L. 169 Isn't M25 125 Ma age ? L. 177 "(" too much L. 219-228 This is more "objectivis" than "Data and methods" L. 229 allows -> allow L. 239 Would be

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nice to have more detail, seize of the airgun array, length of the streamer... L. 390 suggested -> suggest

Gurnis, M., M. Turner, S. Zahirovic, L. DiCaprio, S. Spasojevic, R. D. Müller, J. Boyden, M. Seton, V. C. Manea, and D. J. Bower, Plate tectonic reconstructions with continuously closing plates, *Computers & Geosciences*, 38, 35-42, 2012. Hellinger, S. J. (1981). The uncertainties of finite rotations in plate tectonics. *Journal of Geophysical Research: Solid Earth*, 86(B10), 9312-9318. Chang, T., Ko, D., Royer, J. Y., & Lu, J. (2000). Regression techniques in plate tectonics. *Statistical Science*, 342-356.

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