

## ***Interactive comment on “Geophysical evidence of pre-sag rifting and post-rifting fault reactivation in the Parnaíba basin, Brazil” by D. L. de Castro et al.***

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Anonymous Referee # 1

1. The comparison of gravity and pseudogravity maps in Fig. 5 is, in my opinion, a bit confusing. The two maps reflect, of course, two different physical properties and have different wavelength content. More comment on the possibility of long-wavelength artifacts in the pseudo-gravity map should be added. What kind of assumption has been made outside the survey area? Reply: We clarified the meaning of the pseudo-gravity anomalies, the differences between them, the additional comments on the gravity anomalies and the assumptions we made outside the survey area in Page 7, Lines 23-32.

2. About the seismic lines used, I have a bit of perplexity on the identification of three

different tectonic regimes based solely on the sections here presented. Reply: We now make it clear that our purpose was not describe in detail tectonic evolution of the Paranaíba Basin, but to point out that there are significant variations in the structural style, reactivation patterns and trends of main structures based on the existing geophysical data (Page 11, Lines 11-15). These differences indicate that the tectonic-sedimentary evolution of the basin should be described as diachronic in space and time.

3. In particular, it is hard to compare the L507 and L304 seismic lines with the Ferreira's one (Line 303, bottom panel in Fig. 9 and Fig. 10c) (by the way link to Ferreira's study is missing). In particular, the quality of the interpreted seismic sections in Fig. 10c and 9 is low and I feel that reliability of the interpretation rely more on trust than in a real assessment of data. Some words of caution and more critical assessment of seismic sections, corroborated by better illustrations and proper references, should help the readers to build their own opinion. Reply: We received the seismic data of Profile 103 and the parallel seismic lines. We interpreted and included them in Figures 9 and 10. The illustrations of Figures 9c and 10c are now improved. The missing reference has also been included.

4. My main concern regards, however, the joint gravity and magnetic inversion along the seismic sections. I am not sure about the added value of this analysis. The authors should explain if the performed inversion is 2-D or 3-D, describe what kind of relationship between physical properties and what ranges of parameters (beside the basement) have been tested, and test (and discuss) trade-off with uncertainties of seismic horizons. This way, the authors should have a better assessment of the outcome and limitations of the inversion. Reply: We clarified the 2D joint modeling approach, describing its contribution to mapping the buried rifts isolated by intra-basement causative sources (Pages 12, Lines 15-20). We also mentioned which parameters we investigated and the uncertainties of seismic horizons (Page 13, Lines 6-8).

5. Page 10, row 18-19. Based only on interpretation of seismic sections, this sentence sounds a bit too strong. I advise to modify it. Reply: We rewrote the sentence to

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suggest that fault reactivation occurred during the post-rifting period (Page 10, Lines 29-31).

6. Page 10, row 21 and row 24: It is Fig. 9b and not 8b. Reply: We corrected the text.

7. References: Ferreira 2013 is missing. Reply: We included this missing reference.

Anonymous Referee # 2 I have found, however, some typos throughout the manuscript, which are highlighted in the annotated PDF copy of the manuscript together with some comments and suggestions (mainly on terminology used). Reply: All annotated revision were corrected in the text.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/se-2016-21/se-2016-21-AC1-supplement.pdf>

Interactive comment on Solid Earth Discuss., doi:10.5194/se-2016-21, 2016.

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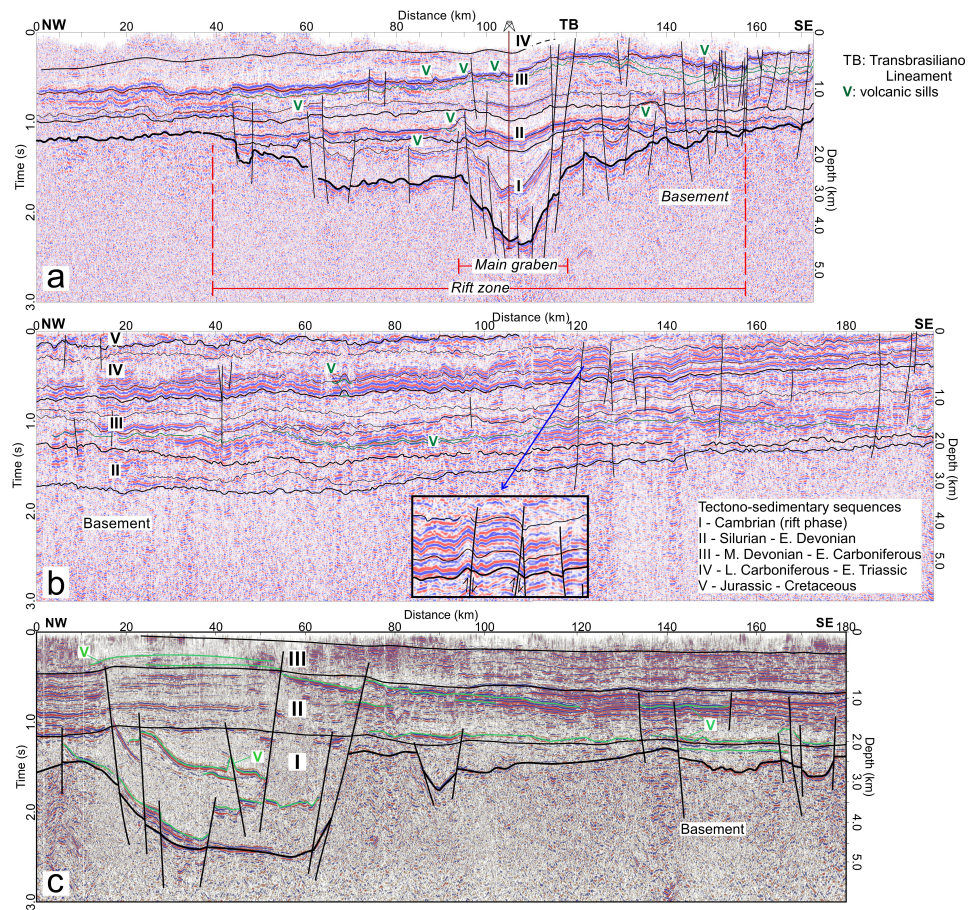


Fig. 1. Figure 9



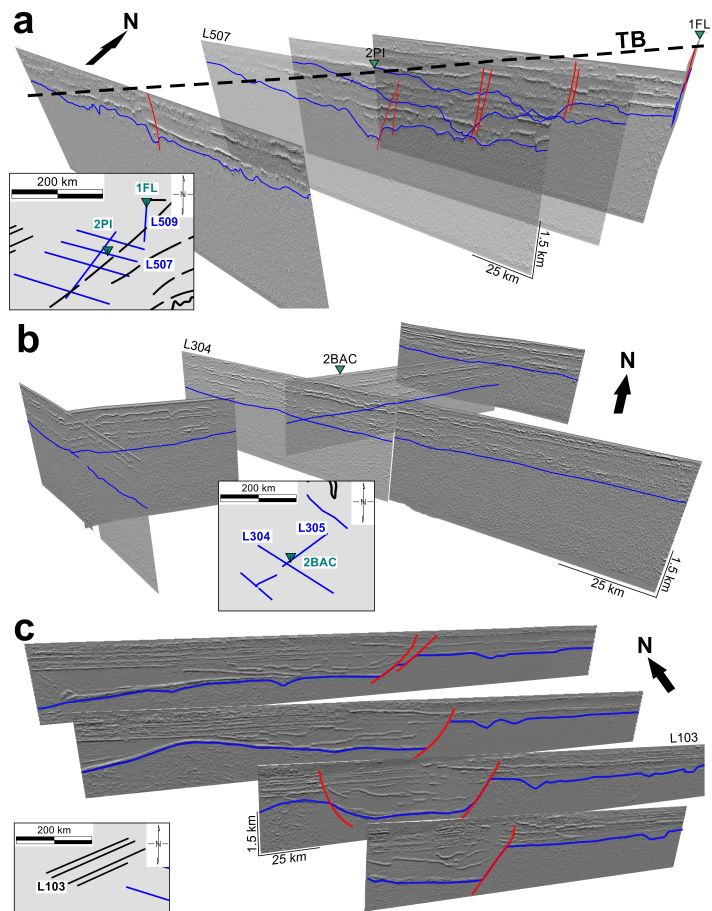


Fig. 2. Figure 10