Solid Earth Discuss., 6, C1427–C1440, 2014
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Solid Earth
Discussions
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Interactive comment on "Fault evolution in the Potiguar rift termination, Equatorial margin of Brazil" *by* D. L. de Castro and F. H. R. Bezerra

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Received and published: 18 December 2014

(1) Comments from Referee #1: The manuscript new geophysical data (gravity, magnetics and geo-electrics) on the SW termination of the Potiguar basin, one of the basins associated with the development of the Equatorial Atlantic margin of N Brazil. The data are clearly presented and interpreted with the goal of defining the (extensional) geometries at the termination of the rift structure. The question addressed is of great importance and has consequences on the way we interpret the geological record preserved. In the case of the Brazilian margin, information on the termination of the Potiguar basin is important for a correct understanding of its relations with the continental margin. In my view, the data is nicely presented and seems to be of good quality. The processing of the data and the first order interpretation are, as far as I can judge, correct and can

be easily followed. More problematic is the translation of the geophysical images in geological section. The geophysical tools used provide only best fit profiles which are considered representative of the geological architecture of the subsurface. This step is less convincing than the purely geophysical ones, probably something inherent in the nature of the methods. For instance, the interpretations of figures 7 and following (half-grabens, position of Master faults etc) leaves more room to interpretation than the authors mention.

(2) Author's response: 1) For instance, the interpretations of figures 7 and following (half-grabens, position of Master faults etc) leaves more room to interpretation than the authors mention. R.: We agree and we have drawn fault traces and schematic geological profiles in the figures 3 to 9 and improved the text with more interpretation.

P. 2887 / Lines 1 and 2: The extensional deformation during the breakup of South America–Africa jumped from the eastern margin to the northwest,... R.: We have rephrased the sentence to make it clear.

P. 2889 / Lines 6 to 8: These lithotypes are... R.: The whole paragraph was rewritten to describe the stratigraphic sequence in the study area.

P. 2893 / Lines 3 and 10: The intermediary geoelectrical layer is... R.: We have changed the text and traced the faults in Figure 6 to make this paragraph more easy to be followed.

P. 2893 / Lines 21 and 27: I suggest to put some labels on the figure to help the non-specialist reader R.: We described the graben locations more precisely and traced the graben areas in Figure 7 to make the text more clear.

P. 2894 / Line 5: really that clear? and all semi-grabens are normally asymmetric R.: We deleted "asymmetric" before semi-graben in the whole text.

P. 2895 / Lines 8 and 22: also these conclusions are difficult to be extracted from the plots. the authors could also insert a cartoon to explain better what they mean R.: We

have drawn fault traces and schematic geological profiles in the figures 3 to 9 to clarify our interpretation.

P. 2897 / Lines 1 and 2: I have difficulties in recognizing this R.: We simplified the sentence to make it clear.

P. 2898 / Line 21: what did the termination of the basin look like during the first stage? R.: We now explain how the rift termination looked like during its first and second stage.

(3) Author's changes in manuscript: Please find attached suplemment PDF file

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Interactive comment on Solid Earth Discuss., 6, 2885, 2014.

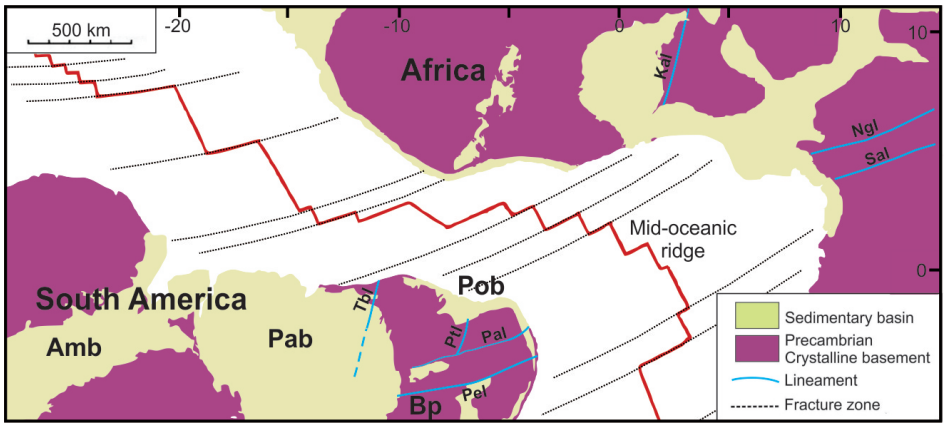

Fig. 1. Schematic reconstruction of northeastern Brazil and western Africa at Chron C34 (84 Ma) showing the main pre rift piercing point and sedimentary basins (Amb - Amazon, Pab - Parnaíba; Pob - Potiguar) i

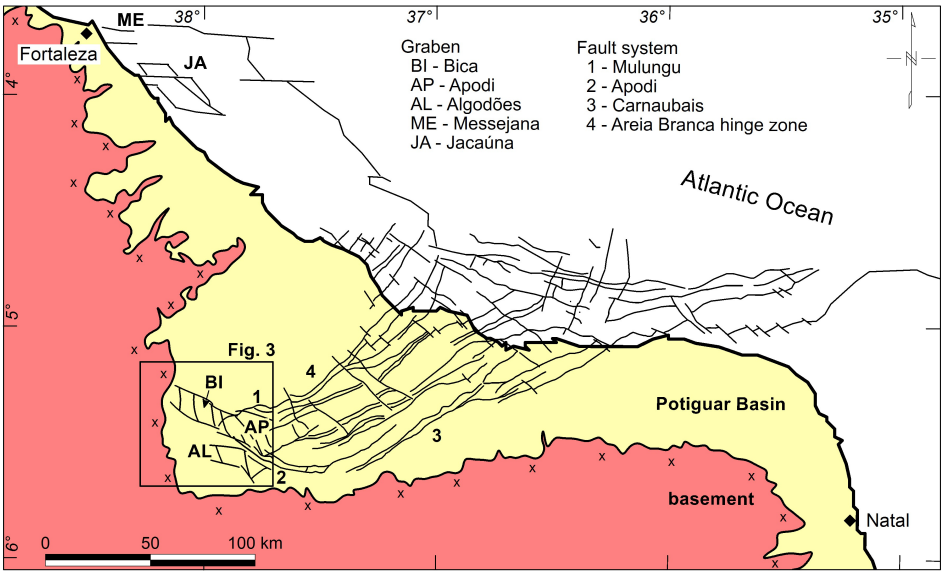

Fig. 2. Simplified geologic map of the Potiguar Basin in NE Brazil (adapted from Angelim et al., 2006). The rift structures in the maps of Figures 2 and 4 are inferred from interpretation of seismic sections

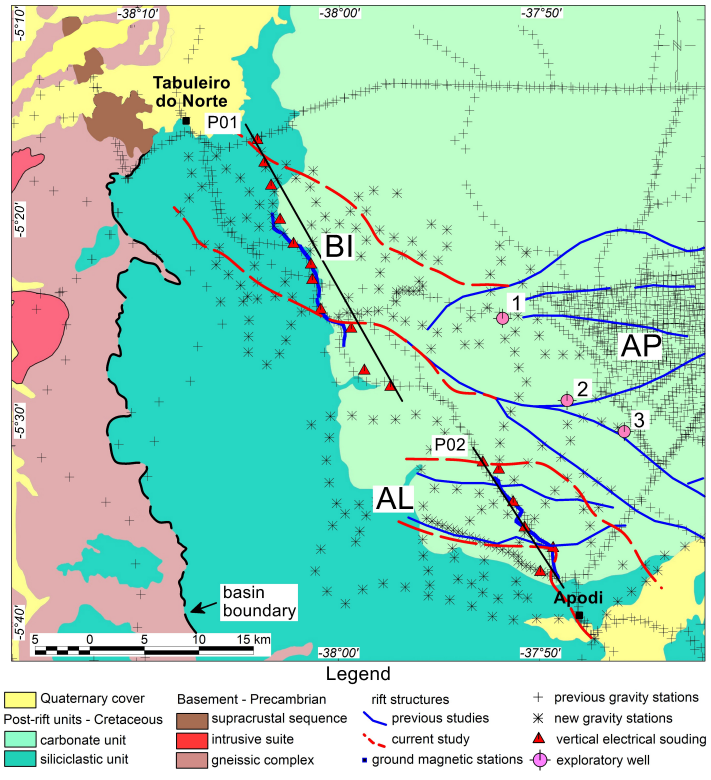

Fig. 3. Geologic map of the SW border of the Potiguar Rift with the location of the geophysical datasets. (Grabens: BI - Bica, AP – Apodi and AL – Algodões; Profiles: P01 and P02 (black lines); Exploratory we

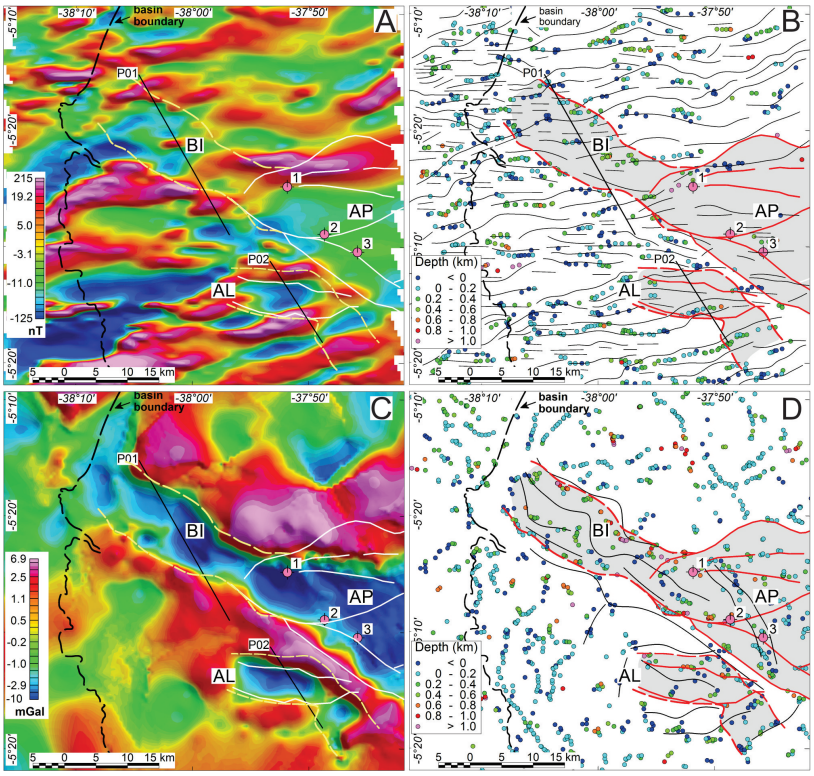

Fig. 4. (A) Residual component of the magnetic field reduced to the pole and (B) major magnetic lineaments and Euler solutions; (C) Residual gravity anomaly map and (D) major gravity lineaments and Euler solu

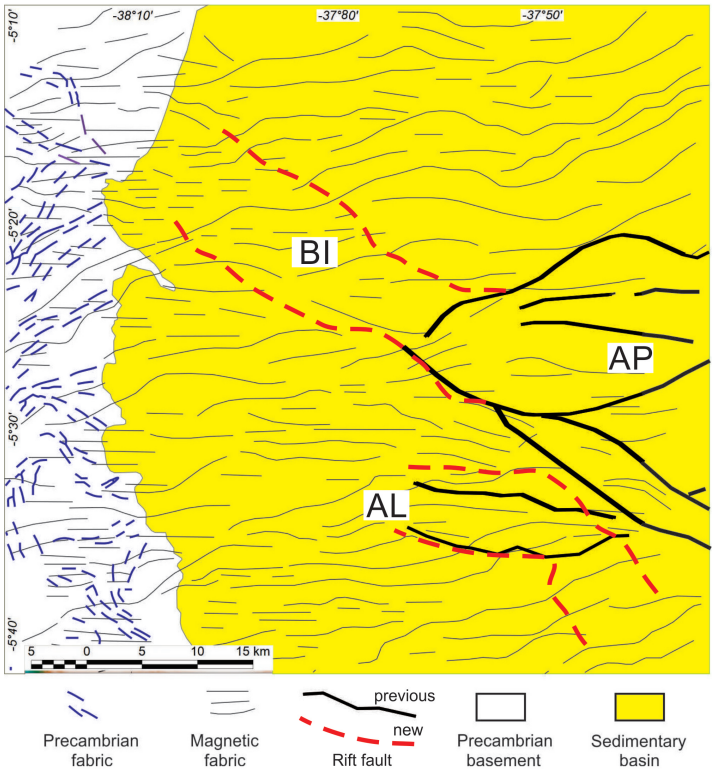

Fig. 5. Comparison between Precambrian structural fabric derived from remote sensing and NE-SW to E-W trending magnetic lineaments. Grabens: BI – Bica, AP – Apodi and AL – Algodões.

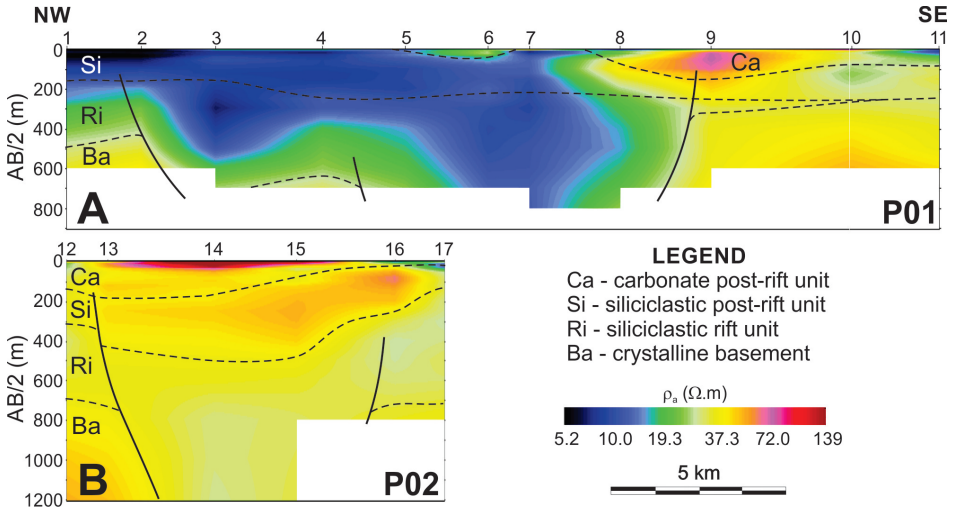

Fig. 6. Interpreted apparent resistivity cross sections of profiles P01 (top) and P02 (bottom). VES locations: 1 to 17.

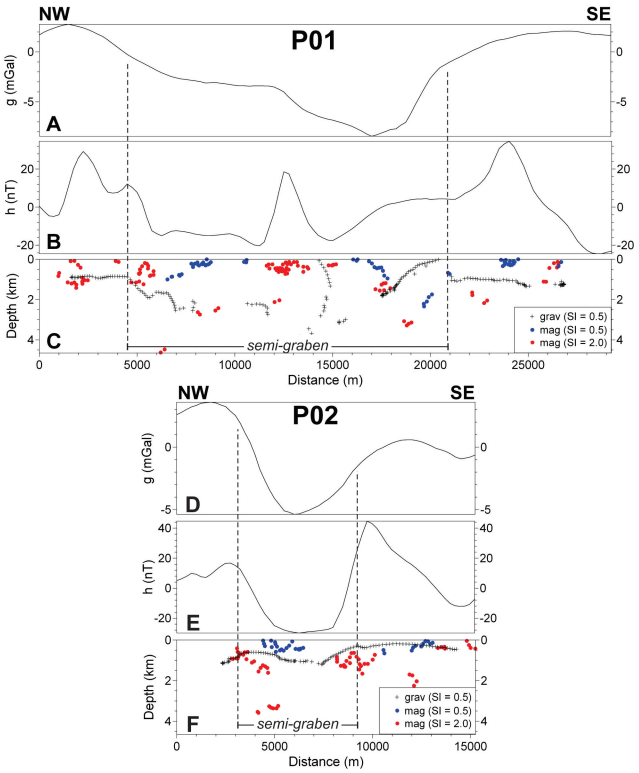

Fig. 7. Gravity (A, D) and magnetic (B, E) anomalies and Euler solutions (C, F) of profiles P01 (top) and P02 (bottom).

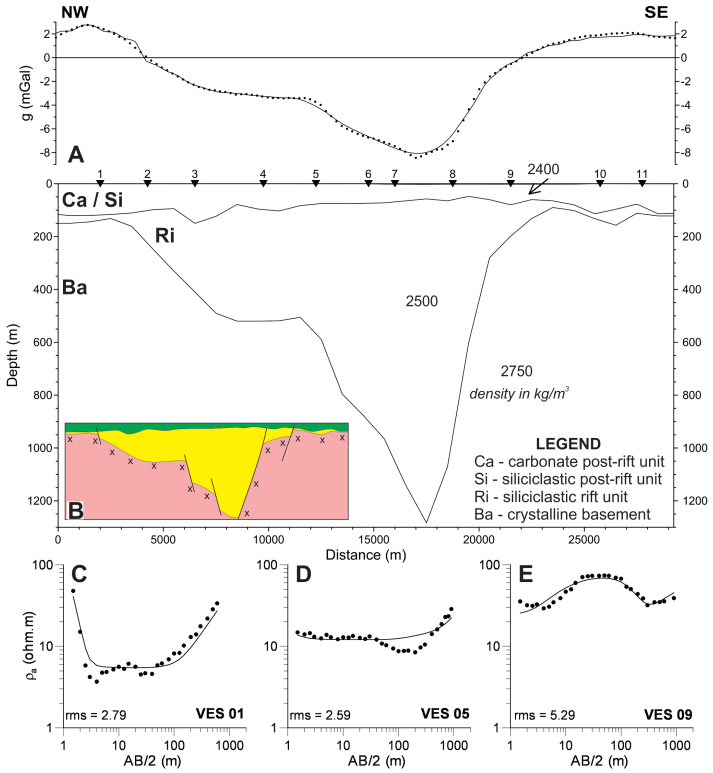

Fig. 8. Observed (dots) and calculated (solid line) gravity anomaly across the Profile P01 (A) and the final model response obtained from joint inversion method (B). Comparison of three VES data (dots) and mo

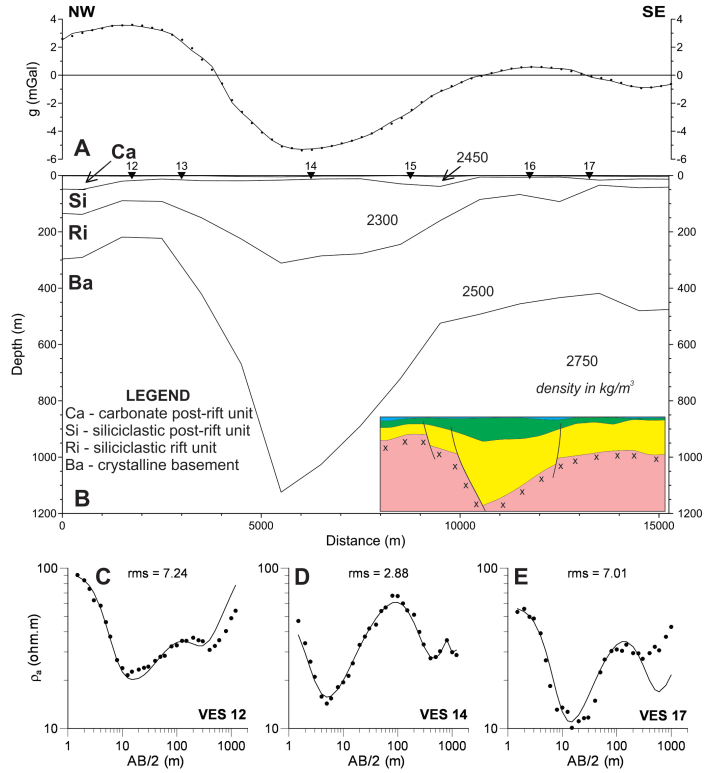

Fig. 9. Observed (dots) and calculated (solid line) gravity anomaly across the Profile P02 (A) and the final model response obtained from joint inversion method (B). Comparison of three VES data (dots) and mo

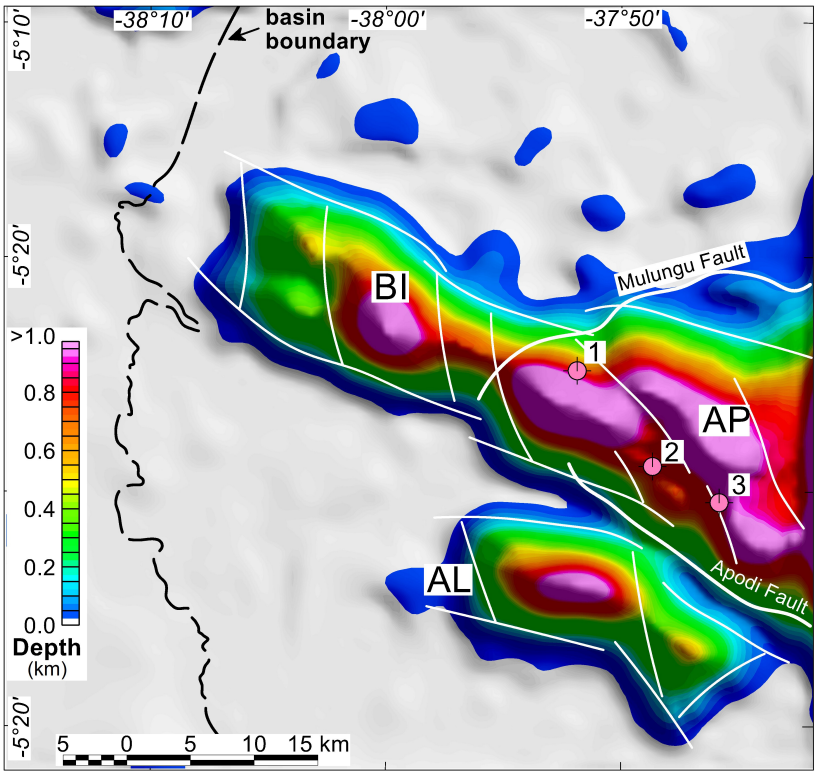

Fig. 10. Basement contour map of the SW border of the Potiguar Rift derived from 3D-gravity modelling with major fault segments (thin white traces). Thick white traces: rift limits from previous studies. Grabe

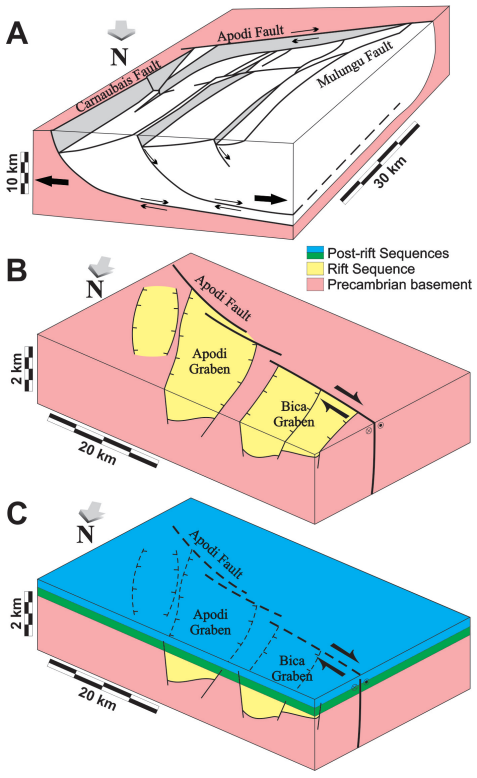

Fig. 11. Cartoon illustrating (A) the main framework of the Potiguar Basin proposed by Matos (1992) (modified from Rodrigues et al., 2014); (B) the geometry and kinematics of the Apodi faults and the N-S-trend