

## ***Interactive comment on “Oblique rifting: the rule, not the exception” by Sascha Brune et al.***

**Sascha Brune et al.**

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Author's response to comments by Reviewer #1

Rev #1: In this paper the Authors investigate the obliquity of major continental rift systems from the onset of Pangea breakup to present by using global plate reconstructions. In particular they quantify rift obliquity by analysing the local extension direction and the assumed rift trend by using the software pyGPlates. The Authors find that the majority of rift systems are oblique by more than  $20^\circ$ , therefore suggesting that rift obliquity is the rule, not the exception. This has important implications for the interpretation of most rift systems on Earth, for which a complex 3D evolution must be considered. Overall, I enjoyed reading the manuscript, which is well written, illustrated and clear; it offers very interesting insights into the process of continental rifting. I therefore support its publication. I only have some minor suggestions, which could

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improve this interesting work, and which are listed below.

Authors: We thank Reviewer #1 for this motivating assessment. All suggestions have been addressed in the manuscript and our responses are listed below.

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Rev #1: Pag,2, Line 9. I suggest not to use the term 'transversely' here. It can be somehow misleading - 'transversal' is normally used to indicate structures trending almost orthogonal to the rift trend. I suggest to replace it with 'obliquely' or similar

Authors: Done.

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Rev #1: Pag,2, Line 12. Maybe a reference to the work by Corti 2008 could be appropriate here

Authors: Done.

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Rev #1: Caption Figure 1. Instead of using the notation  $\sigma_H$  and  $h$ , I suggest to clearly indicate  $\sigma_{Hmin}$  and  $\sigma_{Hmax}$

Authors: Done.

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Rev #1: Pag,2, Line 7. Some references here?

Authors: References added (Chaboureau et al., 2013; Quirk et al., 2013).

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Rev #1: Pag 3. In section 2 (or maybe in the Discussion) the Authors could discuss in some more detail the similarities or differences with the methods used to calculate obliquity in previous works. I refer in particular to the work by Jeannot and Buitert

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(2018), where a similar analysis is presented.

Authors: We extended the comparison to Jeanniot and Buitier (2018) in the discussion section and highlighted similarities or differences of our approaches. See paragraph “Jeanniot and Buitier (2018) evaluated the margin width. . .” in section 5.

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Rev #1: Pag. 7, Line 4. Reference to the work by Withjack and Jamison 1986 needed (before Tron and Brun, 1991)

Authors: Reference added.

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Rev #1: Pag. 8, Lines 8 and following. The relations between rift velocity and obliquity are not very clear to me, and could be maybe discussed in some more detail. In particular, I maybe misunderstood something but the first explanation for this behaviour seems not to be consistent with observations (i.e., the higher the obliquity, the lower the velocity), so it is really not clear to me. Also note that the relation between obliquity and velocity is also repeated in section 3.5 (Gulf of California), at the beginning of Pag 15. In order to avoid these repetitions, and not to mix observations with explanation of results, I suggest to think about moving the interpretation of the correlation between velocity and obliquity to the Discussion section.

Authors: We formulated the relation between obliquity and velocity more clearly and moved it to the discussion section. See paragraph “In many cases, we find a correlation between the obliquity and the velocity of a rift. . .” in section 5.

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Rev #1: Pag. 9, Line 6. . . .Faroe-Shetland basins..

Authors: Done.

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Figure 4. In panel b, I guess the abscissa represents the Time before present, but it is not very clear in its present form (it seems indeed that the X-axis indicates the Frequency of rift velocity). Please check and fix this

Authors: We agree and changed the axis labels of Figure 4. The same problem has been fixed in Figure 6.

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Rev #1: Pag. 10, Line 4. Early ??? (something missing here)

Authors: Fixed.

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Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2018-63>, 2018.

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