

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

### **Anonymous Referee #1**

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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 improve this interesting work, and which are listed below.

Pag,2, Line 9. I suggest not to use the term ‘transversely’ here. It can be some-

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how misleading - ‘transversal’ is normally used to indicate structures trending almost orthogonal to the rift trend. I suggest to replace it with ‘obliquely’ or similar

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

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

Pag,2, Line 7. Some references here?

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 Buitter (2018), where a similar analysis is presented.

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

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.

Pag. 9, Line 6. . . .Faroe-Shetland basins..

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

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Pag. 10, Line 4. Early ??? (something missing here)

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