

Interactive comment on “Bimodal or quadrimodal? Statistical tests for the shape of fault patterns” by David Healy and Peter Jupp

Anonymous Referee #1

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I have now revised with pleasure the manuscript by Healy and Jupp on statistical treatment of bimodal and quadrimodal fault patterns formed in response to a single tectonic event.

While the problem is surely addressed in a correct way from a statistical point of view (and I am not an expert of statistical treatments), my concerns regard the geological significance of results obtained by Healy and Jupp and their application to geological processes of faulting.

(1) First of all, the typical geological contexts/ processes leading to the formation (in a single event or in a relatively short time) of bimodal and quadrimodal/polymodal fault patterns should be explained and investigated in the first/introductory sections of the paper, and then reconsidered in the discussion and conclusive sections.

(2) Once these contexts/ processes are explained, natural fault patterns to be statistically tested should be taken from these explicit cases or, for comparison/contrast, from different cases.

(3) In the case of quadrimodal/polymodal fault patterns, I do not see many alternative cases (I might be wrong) to polygonal faults that are polymodal (normal) faults developed in one single event. I know that many of these faults are known only from offshore areas thanks to seismic images. I wonder whether it would be possible a statistical test using only the fault strikes (instead of fault attitude) that are documented in many papers on polygonal faults based on seismic data. It is also true, however, that polygonal faults start to be known and measured also in many inland cases. For references on papers on offshore and onshore polygonal normal faults I refer the authors to the following paper (Wrona et alii 2017): <https://www.frontiersin.org/articles/10.3389/feart.2017.00101/full>

In synthesis, I suggest the authors to consider fault data from polygonal normal faults and to better explain the geological relevance of their statistical results and applications to geological processes.

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Discussion paper

