Earth Surf. Dynam. Discuss.,
https://doi.org/10.5194/esurf-2019-53-RC1, 2019


Earth Surface Dynamics Discussions

# *Interactive comment on* "Short communication: A semi-automated method for rapid fault slip analysis from topographic scarp profiles" *by* Franklin D. Wolfe et al.

**Christoph Grützner (Referee)**

christoph.gruetzner@uni-jena.de

Received and published: 2 November 2019

General comments This manuscript presents a code that allows to run a rapid fault slip analysis from topographic scarp profiles. Although the concept of topographic scarp profile analysis is not new, the python-based code presented here closes two major gaps: It makes the analysis of a large number of profiles much faster, and it allows users with little or no coding skills to apply the necessary statistical (and Monte Carlo) techniques. The whole workflow can be implemented easily using only open access software, which I find great. I absolutely support the publication of this paper–the code is already available via GitHub(https://github.com/wolfefranklin/MCSST_2019).



The authors use an interesting case study to show that the results obtained with their code do agree with previous data derived by other means. The case study itself is highly interesting, but I wonder if all the information is needed to illustrate the workflow. I think the paper could be shortened to better comply with the format of "Short Communication" (and I think this is the appropriate format). The other option would be to go much more into the details and to show more results from the case study. At present, these details are provided as supplement.

Specific comments

Abstract: - I recommend to add one or two sentences at the beginning of the abstract that explain the need for such a tool. What is the problem with current software, and why is it necessary to present a better one?

1 Introduction: - Also see the MatLab code in:Mackenzie, D., & Elliott, A. (2017). Untangling tectonic slip from the potentially misleading effects of landform geometry. Geosphere, 13(4), 1310-1328.

2 Background - Lines 55-62: Although an interesting and valuable collection of case studies, I think this should be deleted in a "short communication".

4 Workflow: - Line 90: Do the DEMs need to be in UTM?

6 Case Study – Taupo Volcanic Zone (TVZ), NZ In general: I recommend to shorten the geological introduction to the study site substantially. Although it is interesting, please only include the information necessary to show your new tool. For this, most of the background is not needed and a "short communication" is not the right format for telling the whole story.

- line 181-182: "Ideally,..." Will problems arise if this is not the case? - line 199: This is extremely steep for normal faults (Jackson, J. A., & White, N. J. (1989). Normal faulting in the upper continental crust: observations from regions of active extension. Journal of Structural Geology, 11(1-2), 15-36). - lines 224-229: Again, this is all very

fascinating, but check if it is necessary to present your tool. In the next section you argue that the results derived from your (great!) new tool agree with previous studies on the fault system, and this is surely a great outcome - but do you need it to prove that the code is right? To be clear: I do like the story with the rifting and I wouldn't mind to keep it in the paper; i just wonder if the format "Short Communication" allows for this. I'd hope so, but this is the editor's choice.

7 Efficiency of the MCSST Toolkit - Line 233-234: "To confirm the results, the entire process was completed again by multiple users, which resulted in similar outcomes across the board." Can you give error bars? This would be very interesting! How much do the results depend on the user's choices?

Figures: - Make all figures larger. In figure 4, arrange the panels vertically and increase the size of each. Currently, the text is too small to be legible. - Figure 4c: Is this the example from Fig. 2 and 3? Perhaps show figure 4 before you explain the example profile.

Technical corrections - line 92: scarps - line 144: could have - line 181: where - line 225: chronological - Check last line of the caption of figure 4.

Does the paper address relevant scientific questions within the scope of ESurf? -yes Does the paper present novel concepts, ideas, tools, or data? - yes, new tool Are substantial conclusions reached? - yes, the code works well Are the scientific methods and assumptions valid and clearly outlined? - yes Are the results sufficient to support the interpretations and conclusions? - yes Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? - absolutely Do the authors give proper credit to related work and clearly indicate their own new/original contribution? - yes Does the title clearly reflect the contents of the paper? - yes Does the abstract provide a concise and complete summary? -yes Is the overall presentation well structured and clear? - yes, although it may be shortened Is the language fluent and precise? - yes Are mathematical formu-



lae, symbols, abbreviations, and units correctly defined and used? - yes Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? - yes, some reduction is advised Are the number and quality of references appropriate? - yes Is the amount and quality of supplementary material appropriate? - yes

Christoph Grützner

Please also note the supplement to this comment:
https://www.earth-surf-dynam-discuss.net/esurf-2019-53/esurf-2019-53-RC1-supplement.pdf

---

Interactive comment on Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2019-53, 2019.