General comments:

It has been a great pleasure to review the paper by Schwanghart & Scherler entitled "TopoToolbox 2 – an efficient and user-friendly tool for Earth surface sciences". The paper is concise and well written and describe neatly the evolution of an already existing Matlab toolbox using up-to-date algorithms (e.g., Braun & Willett, 2013) and concepts (Perron & Royden, 2013). Being myself a user of the old version of TopoToolbox (Schwanghart & Kuhn, 2010), I find all these new functionalities (e.g., slope-area interactive regression) and capabilities (e.g., speed and memory optimization) really interesting and I thank the authors for developing them and making them free of access for the community.

Despite that I am convinced TopoToolbox 2 will be widely used in the geomorphologic and hydrologic communities, I also believe that this paper does not bring any new significant knowledge or method to the topic of Earth surface dynamics. Indeed, as also mentioned by the authors, most of the routines or algorithms included in TopoToolbox 2 already exist in other languages (e.g., Braun & Willett, 2013) or softwares (e.g., ArcGis, TopoToolbox 1 (Schwanghart & Kuhn, 2010)). The originality of this paper lies mostly in the fact of providing all these optimized and up-to-date algorithms into a single Matlab toolbox, which makes use of recent programing concepts (e.g, Object-Oriented Programming).

Therefore, I am not fully convinced that this paper, in its current form, is appropriate to be published into a thematic journal like ESurf, which is dedicated to "*the publication and discussion of high quality research on the physical, chemical and biological processes shaping Earth's surface and their interactions on all scales*" (http://www.earth-surface-dynamics.net). In my opinion, potential improvements, that will definitely help to reconcile this paper with the topics and goals of ESurf, include (not an extensive list):

- An application of TopoToolbox 2 to a natural setting that raises a scientific issue.
- The development of new/unpublished method(s)/routine(s)/algorithm(s) that would complement TopoToolbox 2 and raise its originality.
- The development of a series of benchmarks that would permit inter-model comparison.
- The use of TopoToolbox 2 to assess quality of different flow algorithms / river-source-head location / flow in flat areas / etc.

However, this is just my opinion, and I believe that the editors probably have a better idea of the potential agreement between the novelty of this paper and ESurf standards. Apart from this criticism, I don't have any other major comments.

Hereinafter, I will first give a formal evaluation of the manuscript, and then point the author towards minor (mostly syntax) comments and some bugs I have founded in the matlab routines.

I hope the authors will find these comment useful.

Philippe Steer

Manuscript evaluation:

- Scientific Significance: 4 (poor)
- Scientific Quality: 2 (good)
- Presentation Quality: 2 (good)

1. *Does the paper address relevant scientific questions within the scope of ESurf?*
   No (in my opinion).
2. *Does the paper present novel concepts, ideas, tools, or data?*
   It presents the new version of a matlab toolbox (TopoToolbox), which previous version was associated to a publication (Schwanghart & Kuhn, 2010).
3. *Are substantial conclusions reached?*
   No, but this new version offers a substantial optimization of the toolbox.
4. *Are the scientific methods and assumptions valid and clearly outlined?*
   Yes.
5. *Are the results sufficient to support the interpretations and conclusions?*
   Yes, but the conclusion is not very ambitious.
6. *Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?*
   Yes (routines of TopoToolbox 2 are provided as supplementary material).
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?
   Yes.
8. Does the title clearly reflect the contents of the paper?
   Yes.
9. Does the abstract provide a concise and complete summary?
   Yes.
10. Is the overall presentation well-structured and clear?
    Yes.
11. Is the language fluent and precise?
    Yes.
12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?
    Yes.
13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?
    No.
14. Are the number and quality of references appropriate?
    Yes.
15. Is the amount and quality of supplementary material appropriate?
    Yes

Minor comments and technical corrections: (**bold** or ~~striked~~ words/letters should be **added** or ~~deleted~~ if existing)

- Page 261 - Line 2: "MATLAB software **designed** for"
- Page 261 - Line 3: ", and deriv~~ed~~ data"
- Page 261 - Lines 9-10: "TopoTolbox ~~has~~ become**s**"
- Page 263 - Line 2: "discouraged ~~interested~~ **potential** users"
- Page 263 – Line 15: " with the release of **the** version 2 of ~~the~~ TopoToolbox"
- Page 264 - Line 25: "Algorithms to derive flow directions are classified into single-neighbor and multiple-neighbor flow algorithms"
  I think this sentence is incomplete. Indeed, the methods that the authors are referring to encompass only those that are based on geometrical/geographical rules, but more accurate methods, based on direct or approximate solving of flow dynamics equations, exist.

- Page 265 – Line 7: "in the first version of TopoToolbox flow directions were stored" change to "flow directions in the first version of TopoToolbox were stored"
- Page 267 – Line 2: "is to provide access to DEM analysis ~~in form~~ **by the mean** of"

Bugs :

- usersguide_1_intro.m
  - The authors make mention of a file usersguide_3_FLOWobj.m (line 180) that does not exist.
- slopeareatool.m
  - Line 350 : change beta(:,colornum) = [SA.k, SA.phi]' by beta(:,colornum) = [SA.ks, SA.theta]'
- FLOWobj.m
  - Examples 1 and 2 of the help of this routine do not work and are not consistent with the syntax proposed in the help. exampledem has to be changed into exampleDEM and the syntax of the following commands give error messages.