

## ***Interactive comment on “A computationally efficient depression-filling algorithm for digital elevation models applied to proglacial lake drainage” by Constantijn J. Berends and Roderik S. W. van de Wal***

**Anonymous Referee #2**

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The paper presents a number of efficiency improvements to an algorithm used to quantify lake depths in topography. The improvements lead to a much reduced computational time, useful for many iterations over glacial time periods.

While the work carried out looks to be robust and of value to a fairly specific application, I wonder whether the work has a broad enough reach to be published in a relatively high impact journal such as GMD. The first line of the paper suggests that the problem of determining lake depths is often encountered in many fields, but doesn't go on to give any examples beyond proglacial lakes. And do these other applications need to

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solve this problem over many iterations? Otherwise the computational time of minutes is not a massive issue, and the techniques presented have a fairly niche application, and could be presented in a paper specific to the application.

The introduction does not give enough background to the task, such that I had to read it a number of times to understand exactly what the task at hand was. Further there is not much detail on the default algorithm, the reader is left to go and read the paper by Zhu et al. (2006), such that it is a bit hard to follow independently.

There are also a lot of vague statements such as “A second issue is an efficient way to determine the water level” on page 3, line 22. Because you don't introduce your terms, such as “base level” and “water level” it is not always easy to follow the methods. Be more specific in these statements to help the reader understand what it is going on. Another example, on page 4, line 18 and Fig. 1, you talk about a true/false mask but don't define what this is. In Fig. 2 you talk about a land/ocean mask, but all I can see is DEM elevations? Is the deep blue actually a mask and not elevations? In this case, this needs to be in the legend.

In summary, the paper looks to be a useful study, but if it is to be accepted must give much more background to the topic and the previous methodology and explain the work being carried out much more clearly.

If the Editor feels the topic is justified being a stand-alone paper in GMD, then with major revisions, the paper could be publishable, however, the authors need to justify the applicability of their improvements beyond their specific case study.

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