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Interactive comment on "The Open Global Glacier Model (OGGM) v1.0" *by* Fabien Maussion et al.

Anonymous Referee #2

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I am sorry for this late review - the summer was distracted and this manuscript was not one to take lightly. Indeed, this paper represents a huge and ambitious undertaking, one that represents a huge leap forward in modelling global glacier response to climate change. I have nothing but admiration for the authors and their contribution. I suspect this paper will become one of the most cited contributions in GMD, as this advance in glacier modelling makes most efforts to date obsolete. As someone that has worked hard on similar kinds of modelling of individual glaciers, the effort to create a state-of-the-art, open-source model that can be applied to 10s of 1000s of glaciers on a global scale is remarkable.

While there are many considerations for model improvement - one could quibble with different simplifications and assumptions - the authors point out most of these themselves, and one needs to start somewhere. This is already an extremely sophisticated treatment on many fronts. I will make only minor comments here. Perhaps only point 5

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Discussion paper

is significant, if I am understanding correctly.

1. The English is often incorrect or awkward, starting with the opening of the abstract: this should be "Despite their importance...." I will not make a comprehensive review of the grammatical suggestions, but a few other points are noted below.

2. p.2, l.33, reference to Elmer/Ice in the ice sheet modelling community. This has also been widely applied to mountain glacier modelling - this should be noted. Also, there are other public-domain ice sheet models such as glimmer (in the CISM family) and ISSM.

3. p.4, l.8, this might be a suitable juncture to note SRTM's resolution (∼90 m) and the year that these elevations date to (is it 2000?). On this topic, is this reasonably well-matched with the RGI outlines? I assume the latter span a range of years - worth summarizing here.

4. p.6, I see that DEM resolution are summarized here, so that maybe covers off the first part of item 3. It would be worth reporting the years for each DEM though - what year(s) does the reference glacier hysometry then refer to?

5. p.7, ll.1-2. I am confused by the square relation, dx = aSˆ2. Maybe I misunderstand, but should this not be a square-root relation? dx = aSˆ(1/2). Dimensionally and conceptually.

6. p.11, l.24, "modelling glacier evolution" - you mean thickness, I think

7. p.18, discussion of ice caps. Does this also refer to alpine icefields, I assume? Mountain complexes with a shared accumulation area and multiple outlets. Please clarify.

8. p.22, l.10 and the discussion around this. The deviations from the scaling law seem consistent with the results of Adhikari and Marshall (GRL, 2012), which was dismissed by Bahr et al (2015). Is it fair to say that the results here are consistent with the expectation that a variety of local factors such as sliding, glacier cross-sectional

shape, mass balance profile, and state of disequilibrium can cause a different scaling relationship, vs. a kind of universal constant for the scaling-law exponent as argued by Bahr et al.?

A few minor points

p.1, l.14, "several dozen glaciers"

p.2, l.3, "superimposed" does not seem quite right. "masked"?

p.3, l.21, "every single one of" or "all of"

p.13, l.15, "these", not "theses"

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