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The Cryosphere
Discussions

Interactive comment on "Significant total mass contained in small glaciers" *by* D. B. Bahr and V. Radić

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Thank you for the comment. We have used the methods described in the suggested reference, and the power law exponents are still approximately 2, as before. Importantly, we want to point out that the existence of a power-law has already been established by theory. Therefore, proving the presence of a power law by using a fit to the data is not our goal and is not necessary for the purposes of this paper. Perhaps most importantly, the exact value of the exponent does not in any way change the conclusions of our paper. However we do agree that it is always best to use the most accurate statistical techniques, and we have reworked the figures to use the updated fits, as suggested.

As noted by the paper referenced in the review, there are several cases where it is not

necessary to "show" the existence of a power law. One of those is when the existence of a power law has already been established by physics, as in our case. Another is when a power-law fit would be a sufficiently accurate approximation of the actual fit. In our case, even if the power-law theory was radically revised, the power-law fit would remain a good estimate of the trend and would be a reasonable way to estimate the volume errors as done in our analysis. In other words, theoretical changes to scaling (outside the purview and purpose of this paper) might be used to refine this paper's results, but would not affect the general conclusions of our paper.

We are particularly pleased however to find that the suggested reference gives a defensible method for estimating the lower-bound point at which the data deviates from a power law. (This deviation could be due to practical limitations in data collection or for other reasons, as discussed in the paper.) In the current version of the paper we carefully "eyeballed" this number as approximately Sdeviate = 1 km2. Using the suggested technique, the value is Sdeviate = 0.8 km2 in figure 1 (global data) and Sdeviate = 1.0 km2 in figure 3 (modeled data). These do not change our original estimate, but defensible numbers are an improvement.

Interactive comment on The Cryosphere Discuss., 6, 737, 2012.