

Interactive comment on “Estimating the volume of Alpine glacial lakes” by S. J. Cook and D. J. Quincey

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Received and published: 19 October 2015

We thank Wilfried Haerberli for his positive contribution to discussion on the issue of volume estimation for Alpine glacial lakes (Short Comment ESurfD 3, C342–C343, 2015). It is encouraging to see that our work is welcomed as a valuable contribution. Two key points emerge from this comment, which we discuss further here.

Firstly, we refer several times in our manuscript to “measured” lake volumes. As outlined in the interactive comment, these lake volumes are not truly measured, but instead represent calculated volumes derived from interpolated bathymetric data. Hence, in any revised version of our manuscript it would be necessary to avoid the use of the term “measured” when referring to lake volumes that have been calculated in this way.

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Secondly, the comment raises the issue of auto-correlation between lake area and volume (area multiplied by mean depth). We have mentioned this issue on p914, as stated in the comment, and also on p919. It is suggested in the comment that we reflect further on this issue. Essentially, we agree with this perspective – plotting lake area against volume gives an unrealistic impression of the predictability of volume from measured area, often accompanied with high r^2 values. The level of unpredictability is demonstrated in Fig 1 and Table 1, which illustrates a wide range of lake depths for any given area. In our manuscript, we have been conservative in our discussion of V-A auto-correlation – we sought to present the data in the same way as in previous studies, and to mention the issue of auto-correlation, but we did not critique this approach in any detail. We agree that in any revised version of the manuscript that it would be important to highlight more fully the shortcomings of presenting and employing somewhat misleading volume-area relationships.

Interactive comment on Earth Surf. Dynam. Discuss., 3, 909, 2015.

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