

Interactive comment on “What glaciers are telling us about Earth’s changing climate” by W. Tangborn and M. Mosteller

Anonymous Referee #3

Received and published: 4 August 2014

This is an interesting manuscript, but unfortunately for wrong reasons. The manuscript suffers from a number of fundamental flaws. Other reviewers and commentators have already pointed out some of these, which I do not wish to repeat here. Nonetheless, I list the followings.

The title is too bold to be justified by the content.

The manuscript is poorly organized. Introduction, for example, should be more rigorous. Authors mostly cite papers that are more than ten years old now. Significant advances have been made in recent years in understanding and modeling mass balance of regional and global glaciers. These are to be discussed properly. A few particular comments include: (1) text provided on page 3477 (line 6-8) is not the introduction material; (2) what is the point of noting that original field manuals of someone were

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updated by someone else? (3) comments on Greenland and Antarctic ice sheet mass balance (page 3477 line 26 onwards) are too surficial.

The manuscript is not self-contained. As a reader (and a reviewer, to some extent), I do not want to navigate back to some old papers to understand the mass balance model employed in this research. At least, you should present the objective function (Section 3.2) that is minimized. It is not clear to me whether your optimization is linear or nonlinear, and constrained or unconstrained. I would imagine you could have constrained the optimization by utilizing the available observations. But, it does not seem so. In this regard, is this really what we call the model calibration (cf. Section 3.2)?

A minor, but unacceptable error: how come negative sign in the expression presented in line 13 (page 3479)?

I might be missing something here, but I did not quite understand the point of correlating a glacier’s (or glacial system’s) mass balance with “global” climate. A glacier responds to changes in local climate. I do not see the direct connection between changes in, say, Himalayan glaciers and climatic conditions in Alaska. It is frustrating to read lines like 16-17 (page 3480) for the same reason. I suspect the good correlation you are reporting on page 3480 (lines 13-20) is just a coincident. You do not seem to have sound physical reasons why the data exhibit bad (or good) correlations (see page 3481, line 1).

Your efforts on developing www.ptaagmb.com and making it interactive are commendable. But, this does not mean that you can merely describe the features of the webpage (Section 5) and submit it to The Cryosphere as the research article.

Provide the name of the country in Table 1. Figure qualities are poor overall.

To summarize, the manuscript does not meet the standards of a research article from any aspect. Authors may perhaps consider overhauling and resubmitting the manuscript as a “brief communication” instead of a research article. Best Wishes.

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