Huss et al. (2010), relying on modelling constrained by relatively abundant data, reported the
detection of a signal due to the Atlantic Multidecadal Oscillation (AMO) in a century-long record of
mass balance for 30 glaciers in the Swiss Alps. The AMO signal, with a period of about 65 years, is
extracted along with a secular trend towards more negative mass balance between 1908 and 2008.

Leclercq et al. draw attention to an apparent overestimate of the relative strength of the AMO signal
identified by Huss et al. The latter calculated conventional mass balances, “conventional” being used
in the sense of Elsberg et al. (2001) and referring to the balance as measured or modelled over the
concurrent extent of the glacier. Leclercq et al. argue that the conventional balance is a response to
both concurrent climatic forcing and the slower evolution of the glacier’s hypsometry, and that to
isolate the response to climate alone it is necessary to calculate the “reference-surface” mass balance
of Elsberg et al., which is the balance the glacier would exhibit if its surface extent and hypsometry
were to remain unchanged from some reference state.

The point made by Leclercq et al. is reasonable prima facie, and their comment ought therefore to be
published. However, the model with which they seek to quantify the overestimate of the AMO signal
is (understandably) very simple. It will be important to await the response of Huss et al. before
judging the accuracy of the simple Leclercq et al. calculations and assessing their claim that the
significance of the AMO is small with respect to gradual warming.

Leclercq et al. do not question the Huss estimate of the magnitude of the sinusoidal AMO signal.
Rather, they assert that the magnitude of the “background” response of the glaciers to warming is
larger than appears in Figure 3c of Huss et al. If that figure showed reference-surface and not
conventional balance anomalies, its dash-dotted “sinusoidal fit” line would (presumably) be steeper
but not less wavy. An acknowledgement of this point by Leclercq et al. would probably be helpful to
readers. One of the notable contributions of Huss et al. was to show that the AMO is detectable at all
in mass-balance records, and recalculating with reference-surface balances would (presumably) make
that contribution more remarkable.

One difficulty in the text of Leclercq et al. will confuse readers if it is not corrected. They consistently
misuse the adjective “specific”, which means “per unit area” (or, in an alternative interpretation of
Meier (1962) that I do not prefer, “at a point”). All of the balance numbers given by Leclercq et al.,
including the reference-surface balances, are “specific”, and all the instances of that adjective need to
be changed to “conventional”.

Cogley (2010), a popular-press article about Huss et al. and its context, may be of interest to some
readers.

Some lesser points:
P2476
L6 Help readers to grasp the argument by saying, at this early stage, what is the appropriate
measure if the conventional mass balance is not.
P2476
L9 The magnitude of the overestimate may itself be overestimated, so “significantly less
important” might be better here than “far less important”. Similarly at P2478 L27 “governed” might
well be replaced by “dominated”.
P2476
L12 Hyphenate “mass-balance” when it is an adjective, as here and at L15, L16, P2478 L2.
P2477
L20 Say whether this is an ice-equivalent or a water-equivalent volume.
P2477
L5 “do not reflect only”.

Comments on “Comment on ... Huss et al. (2010)”, P.W. Leclercq et al., The Cryosphere
Discussions, 4, 2475-2481: 
J. Graham Cogley, November 2010
“for the state of glaciers” (not “on”).

Hyphenate “present-day”.

Delete apostrophe: “1970/80”.

“Great Aletsch Glacier” (or “Grosser Aletschgletscher”).

Move the comma: “AMO, such that”.

I do not understand “the causal relation between the AMO and the mass balance anomaly is opposite at first sight”. It would be clearer to omit “the causal relation between” and to say “the AMO and the mass balance anomaly are out of phase”. But what is wrong with that? And how does this remark support the conclusion arrived at in the next sentence (“This further indicates ...”)?

Delete the mysterious page numbers at the end of each reference.

“50(50)”.

“Unterer Grindelwald”.

For Pizol, change Δb to “–3.00”.


