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Discussions

Interactive comment on "Tracking B-31 iceberg with two aircraft deployed sensors" *by* D. H. Jones and G. H. Gudmundsson

Anonymous Referee #2

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General comments

This paper addresses (1) the monitoring technology and (2) observations of iceberg drift, which are relevant questions within the scope of NHESS. A description of the instrumentation is the emphasis of the paper. However there is little acknowledgement of previous work regarding air-droppable ice buoys/beacons. Air-droppable satellite-tracked ice buoys (or beacons) have been available since the 1970s (Brown and Kerut, 1978, AIDJEX Bull. 40), with the positional accuracy increasing over time with the introduction of ARGOS and GPS. They have been used operationally over several decades on sea ice and icebergs by agencies such as the International Arctic Buoy Programme, the Canadian Ice Service and the International Ice Patrol.

The abstract (and conclusions) refer to the Arctic, yet the beacons described in this paper require a snow pack at least one meter deep, which occurs rarely, if ever, on Arctic icebergs, as mentioned later in the paper. This limitation should be included in the abstract. Also, air-dropped beacons can only be used on very large icebergs because of the difficulty of landing them on small targets, so the iceberg size limitation should be included in the paper.

Most of the data were collected from the glacier before the iceberg calved, after which unfortunately data collection became intermittent. However, there does appear to be quite a bit of good GPS data in December 2013 (Fig. 7). The paper would be greatly improved if more was done with this data, such as plotting more detailed trajectories or velocity components, or comparing the drift with wind conditions.

Specific comments

Page 4610, line 23. While the number of icebergs calved in recent years may have increased somewhat in recent years, global warming has also led to increased sea surface temperatures, which would increase iceberg erosion, leading to decreased iceberg populations in many areas.

Page 4611. Passive microwave is not mentioned as a sensor for iceberg tracking (e.g. Phillips, S. W. Laxon. Journal Article International Journal of Remote Sensing 16(2) 399-405 (1995)).

Page 4611. Other air-droppable ice beacons are also not mentioned (see general comments).

Page 4612, line 12. A fixed wing aircraft does not have the same ability as helicopters for instrumenting most icebergs because of iceberg size limitations (see general comments), and because there is more risk of damaging sensors by air-dropping than by hand-deploying.

Page 4612, line 12. Availability and operation costs of fixed-wing aircraft are unlikely to be more advantageous than those of helicopters in many areas.

Page 4613, line 23. It is not clear at this point in the paper why the device needs to "bury itself", when other ice beacon models can sit on the surface. (Because as later stated, it needs to stand upright?)

Page 4616, line 21. What are the accuracies of the Iridium-based (low-power mode) and GPS-based positions?

Page 4617, line 22. What was the number of GPS and low-power mode position reports (and number of days) after calving?

Page 4617, lines 1-3. Why did the beacons start struggling so soon after iceberg calving, i.e. why would they both become partially buried or fall into a crevasse at this point? Is there significant jolting associated with calving, so that deployment before calving is not recommended? Is it possible that instead, the snowpack weakened due to warming, resulting in tilting of the beacons, or that battery voltage was a factor?

Page 4617, line 5. Limitations due to required snowpack thickness and iceberg size (in order to successfully land a beacon on them) should be mentioned in the conclusions.

Technical corrections

Page 4614, line 27. "vortices", not "vorticies"

Page 4615, line 15: "corridor", not "corridoor"

Page 4616, line 22: "January 2013"?

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 4609, 2014.