

Interactive comment on “Ocean properties, ice–ocean interactions, and calving front morphology at two major west Greenland glaciers” by N. Chauché et al.

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Chauché et al. (2013) present some very interesting hydrographic observations from the proximity of two tidewater outlet glaciers from the Greenland Ice Sheet; Rink Glacier and Store Glacier in the Uumannaq area, Greenland. Data were obtained during two surveys conducted between 10–22 August 2009 and 5–15 August 2010 within a distance between 200 m and 20 km from the glacier fronts.

My major concern of the present paper of Chauché et al. (2013) is the missing bathymetry description of the fjords and the disputable water mass analysis from which different hypothesis and conclusions are made.

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Fjord bathymetry: how are the fjords connected to the coast? Do they have sills or not. The presences of sills have great impact on the water masses distribution inside the fjord.

The water mass analysis in the result paragraph is highly disputable. How can the authors define source waters when two of them are found at the coast outside the fjords and the last one is freshwater from the ice sheet. Remember you have only data from two August surveys from the very inner part of two fjords. To make the water mass analysis more robust you need at least seasonal hydrographic length sections from the continental slope to the inner parts of the fjord. So avoid the exercise.

Five new water masses are defined without any discussion or references to the literature. However, one water mass is linked to references: Subpolar Mode Water (SPMW) to (Mugford and Dowdeswell, 2011; Salcedo-Castro et al., 2011; Sole et al., 2012) but none of the mentioned papers have the word combination SPMW.

With respect to water mass you should consult Mortensen et al. (2011) and their interpretation of stratification near tidewater outlet glaciers Mortensen et al. (2013).

Your MW water can easily turn out to be water with origin at the coast so you have movement of water towards the glaciers in the 200 m to 500 m depth range. This will change your Figure 6 radically.

Additional Commons Page 5582 line 9. Remove estuarine circulation. As the estuarine circulation is associated with the circulation driven by freshwater runoff to the surface layer.

Ref.

Mortensen, J., J. Bendtsen, R. J. Motyka, K. Lennert, M. Truffer, M. Fahnestock, and S. Rysgaard (2013), On the seasonal freshwater stratification in the proximity of fast-flowing tidewater outlet glaciers in a sub-Arctic sill fjord, *J. Geophys. Res. Oceans*, 118, 1382–1395, doi:10.1002/jgrc.20134.

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Interactive comment on The Cryosphere Discuss., 7, 5579, 2013.

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