

Interactive comment on “Inorganic carbon dynamics of melt pond-covered first year sea ice in the Canadian Arctic” by N.-X. Geilfus et al.

Anonymous Referee #2

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This paper describes an interesting and well conceived project of high scientific value. The study is principally well conceived and considering the locality and limitations of sea ice research has yielded interesting results. I have the following comments and suggestions: Abstract. The summary is concise but needs language correction there are two points, which I think are misleading. Melt ponds are a product of snow melting as well as sea ice melting. See your introduction. There should be some mention as to the role or not of the biology in the melt pond or around it. See Results and discussion. Introduction. The introduction is fine showing a good review of the literature, and provides a solid background. However I find that the aspect that melt ponds are sometimes highly productive sites, biologically speaking is not accounted for in the introduction e.g. Phytoplankton production from melting ponds on Arctic sea ice: Lee et al. 2012 Study site, material and methods: The study site appears to be represen-

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tative of typical Arctic sea ice, as described. Methods described are fine, although I find the way the authors arrive at the average ice thickness disconcerting. To determine the ice thickness from cores does not account for the tremendous irregularity of sea ice and especially under ice topography. This is particularly crucial when the data are used to assess melting rates or growth of sea ice. The authors should mention these constraints. A simple transect done with an auger and tape could have improved the results considerably. The fact that biological activity was not really accounted for is also disconcerting. Particularly since samples were apparently poisoned to curtail biological activity. Reference to some measurements done under the ice Page 7501 lines 26-29 is not all that convincing or adequate. See Results Results: Judging by the type of fieldwork involved in this study, the authors have done a good job to compile an excellent data set. See my comments on the determination of ice thickness. The authors need to reflect on the deficiencies regarding their measurements. See comments regarding the biological properties and lack of measurements Discussion: As mentioned previously I find that the omission of biological data or properties weakens the paper. Even if it were only to relate to these in the discussion and consider the significance or insignificance with potential consequences for the budgeting the authors carry out. The discussion is good but there are quite a few language errors, which I have not pointed out specifically considering that there are mother tongue authors involved in this publication. The point that biological properties apparently only marginally affect the carbonate system, which is based on data from the literature, may in fact be so but this needs more precise discussion. The problem is that it appears that the only biological data obtained were by Mundy. What about the melt ponds? I think that the discussion can be condensed somewhat by reducing the number of assumptions. Conclusion: Again I think that the conclusions, as the discussion would benefit from reducing the assumptions and speculation where possible Figures: Figures are ok Literature ok