

***Interactive comment on* “Brief communication: ikaite ($\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$) discovered in Arctic sea ice” by G. S. Dieckmann et al.**

Anonymous Referee #1

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The finding of ikaite in Arctic sea ice is scientifically important and may in itself validate a brief communication such as the paper by Dieckmann et al. The presented finding should, however, be supported by a more extensive data set. In the methods section, reference is made to a parallel set of ice cores, that was taken to determine temperature and salinity. Since the question arises how the ikaite could have formed in the sea ice of the Kongsfjorden considering the low phosphate concentrations, data on salinity and ice temperature are essential and should be presented. Furthermore, the authors discuss XANES results and (the lack of clear) XRD patterns which are not shown in Figures. It would be appropriate to make these results available in the final version of the paper or as supporting information. It is quite unfortunate that the filters were stored in pure ethanol, which may have caused the transformation to amorphous calcium carbonate. Nevertheless, I have no problems with identification of the crystals found as

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ikaite on morphological grounds only. It is impossible for amorphous calcium carbonate to form such a distinct monoclinic morphology. It would be nice to read what the authors intend to do in the future in relation to the finding (new sampling combined with alkalinity and orthophosphate measurements or experimental studies?). Also, some more background information on ikaite findings and conditions of formation could be added. However, this would stretch the manuscript beyond a 'brief communication', so I leave these latter recommendations to the discretion of the editor and authors.

Technical corrections: 1) Please give temperature of refrigerator (page 155, line 25). 2) Please capitalize X-ray (page 156, line 14) 3) I suggest moving first line of second paragraph in section 3 (page 156, line 27 –page 157, line 2) after "the stability range for ikaite" (page 157, line 5).

Interactive comment on The Cryosphere Discuss., 4, 153, 2010.

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