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Interactive comment on “Quantitative reconstruction of sea-surface conditions over the last ~150 yr in the Beaufort Sea based on dinoflagellate cyst assemblages: the role of large-scale atmospheric circulation patterns” by L. Durantou et al.

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Thanks to considering our manuscript, please find below specific responses to the comments.

Discussion

"In the discussion, the large-scale atmospheric circulation pattern and its influence on

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Interactive Discussion

Discussion Paper



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Comment

the precipitation, runoff and ocean circulation pattern is discussed. However, similar studies in other Arctic and subarctic regions are not referred to and discussed in relation to the data in the core. Recently published papers from such regions are Grøsfjeld et al. (2009) and Howe et al. (2010). For example, the occurrence of *Pentapharsodinium dalei* should be discussed in relation to the occurrence of this species in Rijpfjorden (Howe et al. 2009). According to Howe et al. (2009) dinoflagellate cysts have been recovered from sediment trap samples taken from deployments in the Arctic-dominated Rijpfjord, located in northern Svalbard, during 2006-2007. Its high export production is dominated by *Pentapharsodinium dalei* (92.3%) with minor amounts of round brown *Protoperidinium* cysts (3.6%) and *Spiniferites elongatus/frigidus* (2.9%) in the first instance and *Pentapharsodinium dalei* (98.2%) with minor amounts of *Spiniferites frigidus* (1.6%) in the second instance."

This is true. In consequence, we will add some elements in the discussion. These are not definitives, but you can find below general idea of changes in the discussion. "Along the core, the dinocyst assemblages are mostly composed of autotrophic taxa. The high abundance of the cyst *P.dalei*, generally associated with stratified waters and productivity (e.g. Solignac, 2009; Marret et al., 2004) is also found in advection zones of warmer and salty water as the Sassenfjorden (Grosfjeld et al., 2009). Recent study in Rijpfjorden (Svalbard) by Howe et al., (2010) highlighted the presence of this taxon with relatively low abundance of round brown *Protoperidinium* cysts and *S. elongatus/frigidus*, providing evidences of late autumn and summer cyst production. In the same way, the relative abundance of *O. centrocarpum sensu lato* can be associated with advection of warm saline waters, accompanied by the relatively low abundance of the taxa *I. minutum*. Here, dinocysts assemblages are marked by high abundance of the cysts of *P. dalei* and *O. centrocarpum*, accompanied by relatively low abundances of round brown *Protoperidinium* cysts and *S. elongatus/frigidus*. In this case, the relatively short studied time period does not allow long-term observations, but variations of the abundance of *I. minutum* could also be related to the abundance of *O. centrocarpum* along the core. For the time being, the presence of the cysts *P. dalei* here is

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not relied to eutrophization as it is in the west coast of Sweden (Harland et al., 2006) or in the Oslo fjord (Dale et al., 1999) and anthropogenic effects are not evidenced in the studied area."

About organization of discussion part, sequences of discussed elements do not allow to follow your proposed plan.

References

Following the comment about including two more references, we added : Grøsfjeld, K., Harland, R. & Howe, J., 2009. Dinoflagellate cyst assemblages inshore and off-shore Svalbard reflecting their modern hydrography and climate. *Norwegian Journal of Geology* 89, 1-2, 121-134. Howe, J. A., Harland, R., Cottier, F.R., Brand, T., Willis, K., Berge, J.R., Grøsfjeld, K. and Eriksson, A., 2010. Dinoflagellate cysts as proxies for palaeoceanographic conditions in Arctic fjords. In: Austin, W. E. N., Howe, J. et al. (Eds). *Fjordic Depositional Systems and Archives*, Geological Society, London, Special Publication 344, 61-74.

Figures, tables

"A table listing all the recorded taxa should be included. Twenty four taxa are recorded. Only the most common taxa are mentioned in the text. As no table with data is presented, a table listing all the recorded taxa should be included."

We are currently evaluating the need to add tables counting the article that could be published in the special issue Malina. Therefore the utility for the majority of readers may be limited. That does not mean they are not published because they will appear in an other report.

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