

Review of 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, A. Rochon, D. Ledu, and G. Massé

By Simon Bélanger, co-editor of the Malina special issue

General comments:

This work is an important contribution to the Malina program, which addresses among others the climatic variability of the Arctic Ocean at various time scales and in particular that of the southeastern Beaufort Sea. Based on a fine-resolution reconstruction of the sea surface conditions over the last ~150 years using palynological proxies, it shows that patterns in the variability that are related, to some extent, to the large-scale atmospheric modes of variability (Pacific decadal oscillation, PDO, and Arctic Oscillation). Interestingly it shows that relatively warm episodes occurred at least two times during the last 150 years. These warm episodes may be characterized by relatively high dinocysts productivity, but interpretations need to be nuanced further. This data set deserves publication in *Biogeosciences* after revision of some interpretations that are not always sustained by the data.

For example, the peaks in dinocysts influxes do not perfectly matches those of SSS nor SST associated to upwelling episodes during PDO positive phases (~ AD 1930; Fig 4), and no increase in the dinocysts influx occurred during the warmer conditions observed between ~AD 1850 and 1910. In particular, the dinocyst influxes were low during the positive phase of the PDO around AD 1940. This may be due to an imperfect age model. As pointed out by one of the reviewer, uncertainty of the age model needs to be further discussed in the text. For example, is the time uncertainties included in sea surface conditions estimated presented in Fig 4?

Please refer to the annotated version of the discussion paper for specific comments.