Review of Durantou et al.' s paper entitled: Quantitative reconstruction of sea-surface conditions over the last ~150 years in the Beaufort Sea based on dinoflagellate cyst assemblages: the role of large-scale atmospheric circulation patterns.

This paper presents a record of sea-surface conditions from the Arctic based on organic-walled palynomorphs (dinoflagellate cysts, pollen, spores, freshwater algae and reworked specimens) for the last 150 years. The studied sequence was recovered off the Mackenzie River, with the expectation that marine and terrestrial proxies would enable the reconstruction of past river discharge and climatic conditions (dry versus wet). The record has been dated based on radionuclide chronology (^{210}Pb and ^{137}Cs). Quantitative reconstructions for summer sea-surface temperature and salinity, as well as duration of sea-ice cover are derived from dinoflagellate cyst assemblages, using the MAT approach. The authors compare the fluctuations of the reconstructed variables with the Pacific Decadal Oscillation and the Arctic Oscillation indexes and attempt to interpret their findings by correlating with these indexes.

Overall, the paper presents interesting data but has a number of short-comings.

1- Chronology: It is not available so it cannot be assessed. The authors are refereeing to a paper being submitted (Ledu et al.). That is not enough, I would suggest including an age-depth model.
2- Correlation between SSS and SST, and the PDO/AO indexes. According to figure 4, the only correlation that I find significant is between 1979 and 1990s. The others as discussed in the text are not convincing at all. In fact, for some periods, there is an anti-correlation. To convince the reader, a spectral coherence could have been performed, as the authors seem to have confidence in their age model. I was not convinced about the impact of the oscillations on the sea-surface conditions in the Beaufort Sea based on these data.

3- A number of mis-spelling and mistakes are found in the text. See below:

Line 20: correct "sea surface" with "sea-surface"
Line 26: correct "sea surface" with "sea-surface"
Line 29: correct "sea surface" with "sea-surface"
Lines 51-25: Do not understand "the impacts climatic oscillations". Something is missing here
Line 61: replace "essentially" with "mainly"
Line 92: correct "Sea- ice" with "Sea ice"
Lines 117-118: If Fig 1 is printed in BW, then the river plume is not visible
Lines 131-132: Show the Mackenzie River on your map
Line: 171: Correct "40x" with "x 400"
Line 173: correct "foraminifera" with "foraminiferal"
Line 174: correct "counted systematically" with "systematically counted"
Line 175: replace "useful" with "meaningful"
Line 185: correct "sea surface" with "sea-surface"
Line 190: R is a software that contains statistical packages amongst other. Which package was used for the transfer function? Be more specific.
Line 192: Guiot and de Vernal, 2011 is missing from the references
Line 194: what is the reference for the dinocyst reference database of 1429 sites?
Line 198: replace "Data of" with "data for"
Line 243: Correct "Dinocysts" with "Dinocyst"
Line 248: Chose between fluxes or influxes. Not both. Also, give some references about the relationship between cyst fluxes and productivity as it may not be as simple as that. Productivity is reflected on the dinocyst assemblage composition rather than fluxes.
Line 259: There are no fig 2F, 2G or 2H. Confusion with figure 4 may be?

Line 286: Why refers to fig 3 here?
Line 287: correct “were” with “are”
Through the text, it is “cysts of Pentapharsodinium dalei) see line 288.
Lines 316- 319: Should refer to figure 4 here?
Line 332: You never mentioned salinity units before, so why here? Furthermore, salinity has no unit as it is a ratio
Line 378: correct “sea surface” with “sea-surface”
Line 411: replace “coverage” with “cover” (not the same meaning in English), see also line 465
Lines 417-420: not always. See comments above on the correlation between reconstructions and indexes.
Line 420: correct ”sea ice” with “sea-ice”
Line 421: Correct “positives” with “positive”. This statement overstretches the findings.
Line 427: replace “normal” with “present-day”
Line 429: correct “dinocysts” with “dinocyst”
Line 429-431: This statement is not convincingly supported by the data
Line 432: correct ”sea ice” with “sea-ice” twice in the sentence
Line 439: Most authors: be more specific.
Line 447: This section is wrong. The reconstructions show an increase of sea-ice cover with decrease of SST at around 1991.
Line452: correct “sea ice” with “sea-ice” (please also check the rest of the text)
Lines 453- 456: this statement does not match the record. I find it very confusing.
Line 457: Positive against what?
Line 458: replace “sea ice” with “sea-ice cover”
Line 462: correct “sea level” with “sea-level”
Line 474: What does “not appears”?
476: Correct “river” with “River”

Figure1: Place your map in a bigger context to show the Pacific Ocean. Show the Mackenzie River. Show the bathymetric scale.
Plate 1: what is the scale bar?