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Interactive comment on "Influence of North Pacific Decadal Variability on the Western Canadian Arctic over the past 700 years" *by* François Lapointe et al.

Anonymous Referee #2

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General comments

I think this is a potentially nice study on the influence of PDO on Western Canadian Arctic and on the mechanisms relating PDO and a varved record. However the main concern with the paper is that the authors do not clearly state their objectives and the links between the paper sections. At the end of the introduction we do not know if the paper is mostly a comparison between a varved record and PDO observations/reconstructions or if the authors want to study the PDO influence over the last century with correlations.

Specific comments

Printer-friendly version

Discussion paper

The abstract must be reworded. This is mostly a comparison between a varved record and PDO observations/reconstructions (P 2 L 6. “Here, sedimentological evidence from an annually laminated (varved) record highlights that North Pacific climate variability has been a persistent regulator of the regional climate in the western Canadian Arctic.”). The conclusion of the abstract (P 2 line 15-20) says nothing on the results/implications of THIS paper. (PS Now that I have finished to read the paper I have partially changed my mind on this comment, however I see that the problem is that you do not clearly state your objectives and the methods you apply to reach them)

Introduction. The objectives of the study are not illustrated.

Section 2.2. You must describe here your data. Not at the end of the introduction which is the place for objectives.

Section 3.3. Do you think that the spectral analysis can also be influenced by the origin of the data (tree-rings, varved records) and not only by the modes? For example, you use a box-cox transformation to stabilize variance in your time series. What do you get in terms of spectral analysis if this transformation is not applied?

P 2 Line 10. “suggesting drier conditions during high PDO phases” P 2 Line 14. “A reduced sea-ice cover during summer is observed in the region during PDO- (NPI+)” I do not understand. PDO is negatively correlated to precipitation but positively correlated to sea-ice cover during summer? Could you please simplify and clarify the description of the processes?

P 3 Line 16. It is really not clear what these correlations indicate, where we can see these correlations and why you speak of this in the introduction.

P 3 L 20. this paragraph is material and not introduction.

P 7 L 5. “When a 5-year running mean is applied on the series, the coherence between both records is much stronger (Fig. 4b: r = -0.39).” This is probably not true. You must take into account the reduction of degrees of freedom due to smoothing. Same

comment for the line just after.

P 8 L 18. “Hence the two modes, during AO+ and NPI+, might constructively interfere to strengthen northerly winds over the Arctic,” I do not know if they “constructively interfere” or if they share in part the same signal.

P 10 L 8. “suggesting some potential for decadal-scale climate prediction.” Could you please further elaborate?

Technical corrections

P 4 L 14. the sentence must be replaced with “a dataset that provides robust observations”

P 4 L 15. “The PDO as defined in (1997)” By whom?

P 4 L 17. “A second PDO index, based on the Extended Reconstructed Sea Surface Temperature (ERSSTv4) dataset . . . was constructed by regressing the ERSSTv4 anomalies against the Mantua PDO index using the period of overlap, resulting in a PDO regression map for North Pacific ERSST anomalies.” Sentence to be reworded.

P 5 L 13. Dee et al 2011. Reference not well cited.

P 8 L 14. “It has been shown that PDO and Arctic Oscillation (AO) when both are in a positive increase summer precipitation in regions of Alaska (L’Heureux et al., 2005).” Something wrong in the sentence?

P 8 L 17. “albeit slightly less significant results” ???

Figure 1. c shows time series and not correlations.

Figure 2. c shows time series and not correlations.

Figure 3. I do not understand from the legend if one time series was shifted by 2 years.

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