Review of
"**The contributions of the leading modes of the North Pacific sea surface temperature variability to the Arctic sea ice depletion in recent decades"**
by Yu et al.

This study investigates the Pacific SST modes and possible relationship to Arctic summer ice cover. The first mode is global warming mode, while the 2nd the PDO mode. Then the EOF coefficients are regressed to 500hPa height, SLP, wind, and SAT fields to obtain the regression maps. The conclusions and discussion are based on these regression results. Some of the results are well known and expected, basically descriptive or qualitative. Dynamical and thermodynamical explanations are laced, and the conclusions are not convincing.

Majors:

1) September ice data should be considered summer in the Arctic, because of the minimum ice cover, see many others' definition: winter: month 1, 2,3; spring: 4,5,6; summer: 7,8,9; fall: 10,11,12
2) First EOF SST mode is very similar to the 2nd mode in space and time (Fig. 2), except weaker in space. If you calculate the coef between the two, it should be correlated (please do so). Then, the question is these two modes may not be separated, 30% vs 22% or at least they are correlated. Please test they can be separated using North et l (1982)
3) If the same EOF is applied to the North Atlantic, is the 1st mode the same as this Pacific global warming mode because it is defined as the GLOBAL Warming? Or the AMO is major forcing from the Atlantic side with the same warming trend?
4) When the global mode is repressed to SLP, an AO/NAO mode appears (Fig. 8 and related discussion), this indicates the so-called the global mode is something related to AO/NAO, which has a long-term trend. Therefore, only using PDO and global warming modes can be very misleading, because there are ENSO mode, and AO/NAO and AMO modes from the Atlantic side. Therefore, it is not that simple; and the conclusions are not convincing
5) The work is basically qualitative. To describe the mechanisms, the oceanic heat transport from both the Pacific and Atlantic, and atmospheric heat transport into/out of Arctic may be calculated, and correlated to global and PDO modes
6) Fig. 4. The sea ice concentration varies from 0 to 10 or 0 to 100%, which is not a random variables, strictly speaking. This is why the changes can be seen only on the first year ice area, rather than the central Arctic (white area). Actually, the sea ice there also experiences significant decline.
7) Fig. 9. The AO mode here is not a typical AO mode, it is more like a combined AO and other modes not investigated here.

Based on my professional training and knowledge, I would not recommend it to be published in the Cryosphere, because of above concerns and confusions.

Minors:

English needs polishing throughout

Fig. 10. The anomalous wind fields are difficult to digest.
Fig. 3. Are the two modes separated?