

## ***Interactive comment on “Ocean acidification from 1997 to 2011 in the subarctic western North Pacific Ocean” by M. Wakita et al.***

**Anonymous Referee #2**

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The research work “Ocean acidification from 1997 to 2011 in the subarctic western North Pacific Ocean” presented by Wakita et al., used the combined data of TA, DIC and the physical parameters from K2 and KNOT time-series stations during 1997–2011, to evaluate the ocean acidification in the subarctic western North Pacific Ocean, obtained some new knowledge about it and drawn some significant conclusions. The calculated methods are reasonable generally, however, there are something need to improve for this study. 1. It seems there is no problem to combined K2 and KNOT data together for the sake of using enough data to clarify the acidification trends in the subarctic western North Pacific Ocean, however, it could be great different with each other In effect because the KNOT time-series station lies in the edge of subarctic front, whereas K2 lies in the Western Subarctic Gyre. It should be obviously different in hydrography. In order to combine the data measured those two different stations, salinity  
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normalized should be applied. i.e. nDIC and nTA are more reasonable, not just use TA and DIC. 2. The observation data of carbonate system were TA and DIC only, and the other parameters were all calculated by using CO2SYS software. It could be done as that Generally speaking, however, it was limited to used in the stable-state model, and it will be not accurate when it changed in non-stable state situation. For example, it is another story if there is a strong advection transportation there. Authors should make sure this and proof it. 3.  $[Ca^{2+}]$  were estimated from Salinity by  $[Ca^{2+}] = 0.01028 * S/35$  in this study, however, it is not always true if there is notable carbonate forming biota in the surface and subsurface waters. Cited more biological evidence to prove it if you believe it that there is no such worry about it. 4. To avoid the effect of advection transportation, nDIC should be plotted out to compare with DIC. 5. The Seasonal variations of  $xCO_2$  and DIC, should be plotted as a sole curve each year, with one curve once a year if possible, in order to compare the annual variations of acidification trends there. 6. Fig. 2 is too small, should to be adjusted.

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