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Interactive comment on "Acidification-vulnerable carbonate system of the East Sea (Japan Sea)" *by* Taehee Na et al.

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We greatly appreciate the reviews and comments. They provided us a chance to thoroughly re-examine the data. It turned out that Reviewer1's and Dr. Kosugi's insight was correct. To our great regret, we found that some of the data had errors indeed. Mistakes in early data production of dissolved oxygen (DO) and dissolved inorganic carbon (DIC) in 2014 were not properly checked and these mistakes went unchecked in the process of manuscript writing through multi-institutional collaboration. In conclusion, we found that correct DO and DIC concentrations did not show any significant meridional, basin-to-basin difference. Therefore, our argument based on the meridional difference is not justifiable and needs to be revised thoroughly, if we are given a chance. However, our major argument, namely the vulnerable nature of the East Sea

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(Japan Sea) to acidification, is still valid. Actually, with better data quality, our argument is even stronger now. Details of the data correction and necessary revision are summarized as follows.

1. DO: The originally reported DO concentrations in 2014 were sensor data that were not corrected using titration results. Upon calibration of the sensor data using the titration data obtained at every site, we found that the values at deep sea interior were similar and did not show any significant meridional trend (Figure 1). Therefore, AOU values calculated from the corrected DO were similar at all sites and did not show any significant meridional trend as well (Figure 2).

2. DIC: We calibrated our DIC measurement to that of the CRM (distributed by A. Dickson, Batch 132, reported DIC = 2032.65$\pm$0.59 umol kg-1). For the originally reported data, we used the average concentration of several measurements of the CRM during the course of DIC analysis (Figure 3). Because a drift in CRM measurement was not properly incorporated by this calibration method, we newly corrected our results by using the nearest values of CRM measured before and after each sample. This way causes additional correction of up to 4 umol kg-1 (Figure 3). We originally reported $\sim$11 umol kg-1 difference between the Japan Basin and the Ulleung Basin. Now, adopting a new calibration method, the difference is $\sim$6 umol kg-1 (Figure 4). Based on multiple triplicate-measurements of CRM, we report our measurement uncertainty is 3 umol kg-1. Therefore, we are not confident to claim that there was a significant meridional difference in DIC between the basins.

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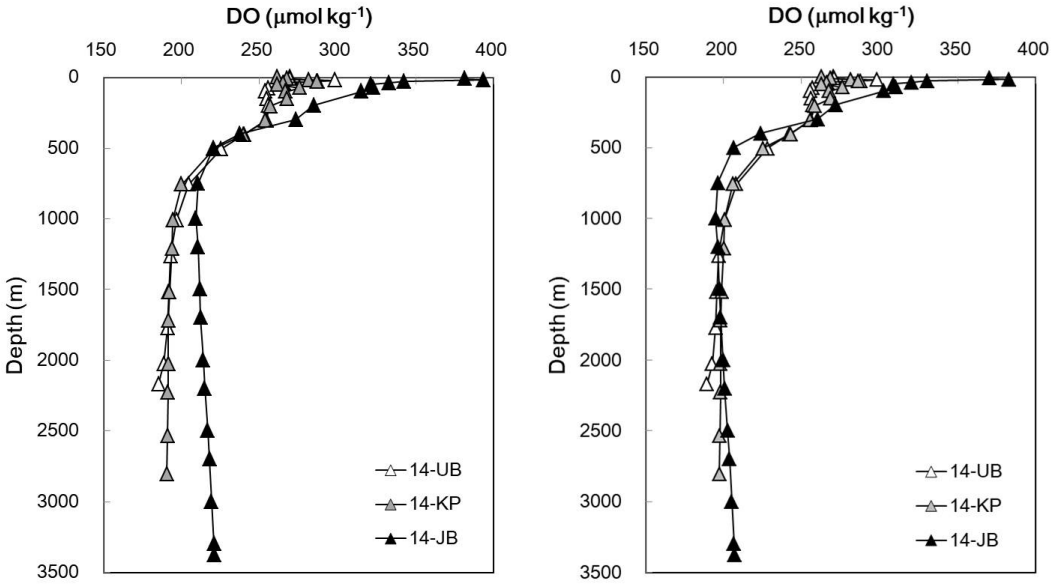

Figure 1. (left) Dissolved oxygen concentration based on sensor results as reported in the submitted paper and (right) dissolved oxygen concentration after correction using titration results.

Fig. 1. DO

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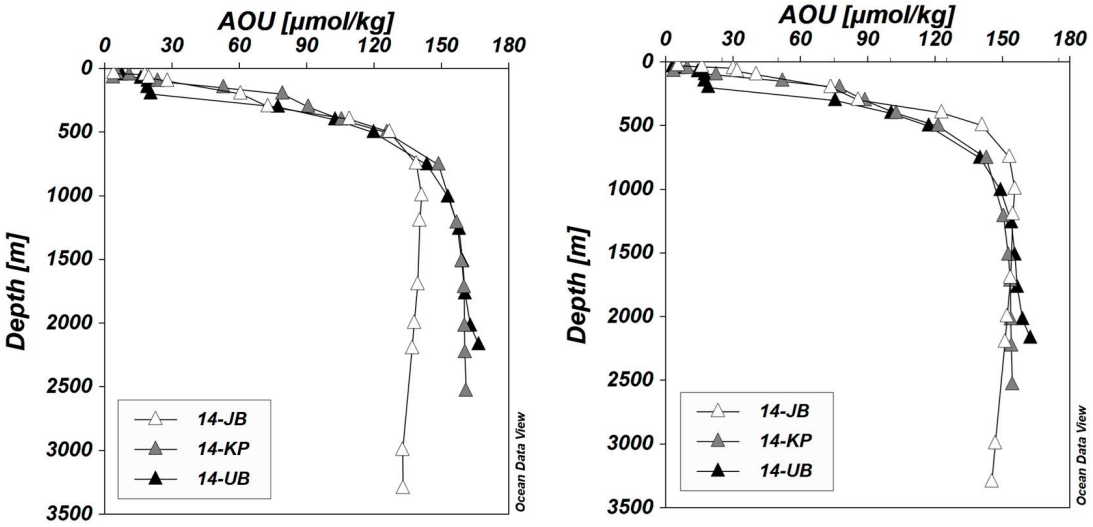

Figure 2. (left) AOU values originally reported and (right) AOU values calculated from corrected DO.

Fig. 2. AOU

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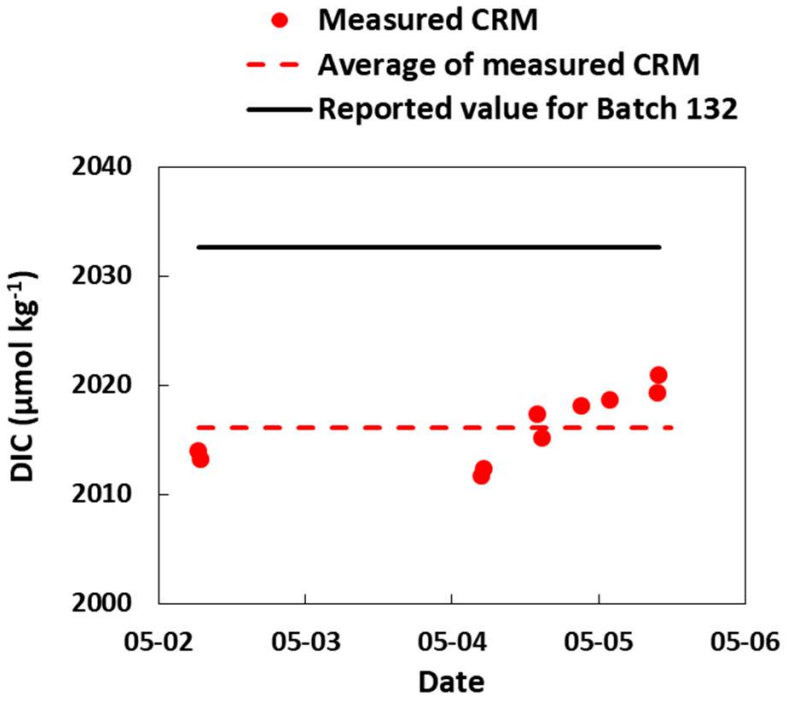

Figure 3. Measured DIC concentrations of the CRM (symbols), reported DIC concentration of the CRM (solid line), and the average CRM concentration originally used for calibration (dashed line) with respect to the measurement date.

Fig. 3. DIC calibration

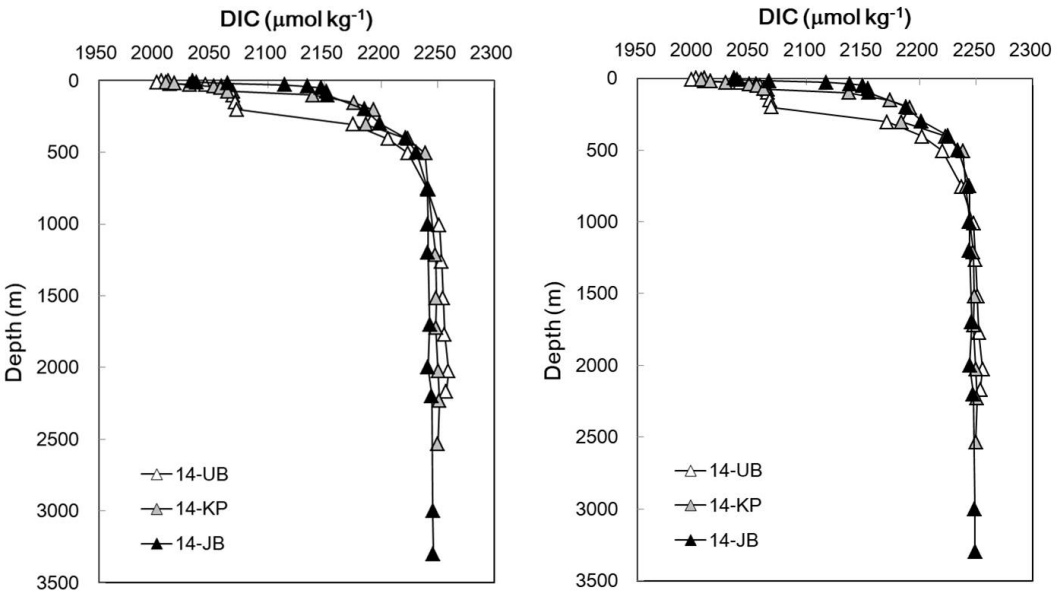

Figure 4. Vertical distributions of (left) originally reported DIC concentration and (right) re-calibrated DIC concentration.

Fig. 4. DIC

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