

We deeply appreciate the time and effort that the referee has spent in reviewing our manuscript and the comments are really thoughtful and helpful. We revised the manuscript following the comments exactly.

COMMENT: Data availability: Is the dataset used in this manuscript publicly available? A data availability statement should be noted.

RESPONSE: The dataset used in this manuscript has not been publicly available yet, but the relevant atlas and research reports have been officially published which are listed in the references.

COMMENT: Line 1: A term “China Sea” in the title is unclear. It should be changed correctly, such as “Chinese shelf waters” or “Chinese offshore waters” from the text, or “the Bohai, Yellow, East China and South China Seas” for more correctly.

RESPONSE: we also think the “Chinese offshore waters” is more precise and have changed the title.

COMMENT: Lines 98-99: “Total Alkalinity ΔTA ” should be changed to “Total Alkalinity (TA)”, and “Total Dissolved Inorganic Carbon, ΔDIC ” should be changed to “Total Dissolved Inorganic Carbon (DIC)”.

RESPONSE: The text has been revised in accordance with the above comments

COMMENT: Line 101: “Ryan (2014)” should be changed to “Ryan et al., (2014)”. Also, Feistel (2011) is cited at Line 117, but it does not exist in the references. Please check all citations and references.

RESPONSE: The text has been revised in accordance with the above comments, while Feistel (2011) is cited at Line 117 has been changed to ‘Feistel et al., (2010a)’ which has been listed in the references.

COMMENT: Line 104: Please explain what $\Delta N[Ca^{2+}]$ is, similarly to the explanation of $\Delta[NTA]$ above (Lines 98-99).

RESPONSE: The explanation of $\Delta N[Ca^{2+}] = Ca^{2+} - 10656.6 * S_p/35/(\mu mol \cdot kg^{-1})$ which appeared in section 3.4 has been moved to Lines 98-99.

COMMENT:Line 145: Judging from Table 1, “from 0 to 0.30 g kg⁻¹” should be changed to “from -0.05 to 0.28 g kg⁻¹”. Also, Lines 159 and 266 should be corrected accordingly.

RESPONSE: The text has been revised in accordance with the above comments.

COMMENT: Line 157: The minimum value (-0.05 g kg⁻¹) seems to be quite large negative value. It should be noted which property (TA or DIC) contributes to the large negative value.

RESPONSE: All the stations with negative δS_A have been checked, in which 54% and 26 % appears in spring and winter respectively and mainly arises from $\Delta[\text{NTA}]$.

COMMENT:Line 241: “PIC” should be changed to “Particulate Inorganic Carbon (PIC)”.

RESPONSE: The suggested change was made.