

COMMENT: Abstract: "Instead of silicate, CaCO<sub>3</sub> originating... " Say why silicate is mentioned here.

RESPONSE: Added "...silicate, the main composition anomaly in the open sea" to the abstract to show the relative composition anomaly difference between China offshore sea water and the open sea.

COMMENT: line 116: spell out GSW

RESPONSE: The text has been changed to "...Gibbs-SeaWater Oceanographic Toolbox... "

COMMENT: line 211: typo "heavily influenced"

RESPONSE: The text has been corrected as suggested

COMMENT:line 241: spell out PIC

RESPONSE: The text has been modified to "... particulate inorganic carbon"

COMMENT: Line 77, Italic *S* in Sp

RESPONSE: The text has been revised to "*Sp*"

COMMENT: Line 79, Practical Salinity not practical salinity.

RESPONSE: The text has been revised to "Practical Salinity".

COMMENT: Line 114, McDougall not Mcdougall.

RESPONSE: The text has been revised to "McDougall ".

COMMENT: Line 116, GSW reference is: McDougall, T.J. and P.M. Barker, 2011: Getting started with TEOS-10 and the Gibbs Seawater (GSW) Oceanographic Toolbox, 28pp., SCOR/IAPSO WG127, ISBN 978-0-646- 55621-5.

RESPONSE: This reference has been added to the references list.

COMMENT: Lines 175 – 178, space between the numbers and their units.

RESPONSE: The spaces have been added to the above lines.

COMMENT: Line 241, what is PIC ?

RESPONSE: PIC is short for particulate inorganic carbon and has been replaced with "particulate inorganic carbon" in the text.

**COMMENT:** Line 244, Practical Salinity not practical salinity.

**RESPONSE:** The text has been revised to "Practical Salinity " .

**COMMENT:** Line 250, 253, 266, and 274, space between number and units.

**RESPONSE:** The spaces have been added to the above lines respectively .

**COMMENT:** Also in the references some initials are lower case.

**RESPONSE:** The references have been rechecked and revised.

**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, but the relevant atlas and research reports (Xiong xuejun, 2012; Ji Weidong, 2016; State Ocean Administration of China, 2016) have been officially published which are all 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:** I think the “Chinese offshore waters” is more precise.

**COMMENT:** Lines 98-99: “Total Alkalinity  $\Delta TA$ ” should be changed to “Total Alkalinity (TA)”, and “Total Dissolved Inorganic Carbon,  $\Delta DIC$ ” 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<sup>-1</sup>” should be changed to “from -0.05 to 0.28 g kg<sup>-1</sup>”. 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<sup>-1</sup>) 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  $\delta S_A$  have been checked, in which 54% and 26 % appears in spring and winter respectively, which is also contributed by  $\Delta[NTA]$ .

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

**RESPONSE:** The suggested change was made.

## Relevant changes list

COMMENT	Changes
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.	Line 1, the title has been revised to "Estimating the Absolute Salinity of Chinese Offshore Waters using nutrients and inorganic carbon data"
Abstract: "Instead of silicate, CaCO <sub>3</sub> originating... " Say why silicate is mentioned here.	Line 17-18, "...silicate, the main composition anomaly in the open sea" has been added.
Line 77, Italic <i>S</i> in <i>Sp</i>	Line 78, the text has been revised to " <i>Sp</i> "
Line 78, Practical Salinity not practical salinity.	Line 78, the text has been revised to "Practical Salinity".
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)".	Lines 99-100, the text has been revised as " ... is the standardized change in Total Alkalinity (TA),... is the standardized change in Total Dissolved Inorganic Carbon (DIC)."
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.	Line 102: "Ryan (2014)" has been changed to "Ryan et al., (2014)".  Line 121, the text has been changed to "... Feistel et al., (2010a)" which has been listed in the references.
Line 104: Please explain what ΔN[Ca <sup>2+</sup> ] is, similarly to the explanation of Δ[NTA] above (Lines 98-99).	Lines 106-107, 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 added
Line 114, McDougall not Mcdougall.	Line 117, The text has been revised to "McDougall".

line 116: spell out GSW	Line 119, the text has been changed to "...Gibbs-SeaWater Oceanographic Toolbox... "
Line 116, GSW reference is: McDougall, T.J. and P.M. Barker, 2011: Getting started with TEOS-10 and the Gibbs Seawater (GSW) Oceanographic Toolbox, 28pp., SCOR/IAPSO WG127, ISBN 978-0- 646- 55621-5.	Line 121, "McDougall and Barker, 2011" has added to the text.  Line 312-315, this reference has been added to the references list.
Line 145: Judging from Table 1, “from 0 to 0.30 g kg <sup>-1</sup> ” should be changed to “from -0.05 to 0.28 g kg <sup>-1</sup> ”. Also, Lines 159 and 266 should be corrected accordingly.	Line 148, the text has been revised to "...ranges from -0.05 to 0.28 g kg <sup>-1</sup> ... "
Line 157: The minimum value (-0.05 g kg <sup>-1</sup> ) seems to be quite large negative value. It should be noted which property (TA or DIC) contributes to the large negative value.	Line 167-168, "In this region, 54% and 26 % of negative $\delta S_A$ appears in spring and winter respectively, which is also mainly arises from $\Delta[NTA]$ . " has been added.
Lines 175 – 178, space between the numbers and their units.	Lines 179 – 181, the spaces have been added to the above lines.
line 211: typo "heavily influenced"	Line 215, The text has been corrected to "heavily influenced"
line 241: spell out PIC	Line 243, The text has been modified to "... particulate inorganic carbon"
Line 241, what is PIC ?	Line 243, "PIC" has been replaced with "particulate inorganic carbon" in the text.
Line 244, Practical Salinity not practical salinity.	Line 245, the text has been revised to "Practical Salinity".
Line 250, 253, 266, and 274, space between number and units.	Line 251, 254, 267, 275, the spaces have been added to the above lines respectively .
Also in the references some initials are lower case.	The references have been rechecked and revised.

