

## ***Interactive comment on “Hypoxia disaster in waters adjacent to the Changjiang estuary” by X. F. Luo et al.***

**X. F. Luo et al.**

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We thank both reviews for very constrictive comments and suggestions. These are very helpful in guiding our revisions of the manuscript. We make the efforts to thoroughly revise in order to improve the presentation of our data analysis and the interpretation of results. A point-to-point response to comments is provided below. Please also note that we have changed the title of this manuscript to “On influencing factors of hypoxia in waters adjacent to the Changjiang estuary” and added an additional author (Youyu Lu).

Reviewer 2: Based on a new and extensive dataset (cruises) the authors intent to relate the dynamics of hypoxic area (formation, spatial distribution, timing) in the Changjiang Estuary to local hydrodynamics features. The strong hypoxic event documented high-

C1

lights the scientific relevance of the issue. The most important conclusion is that the interannual variability of hypoxic events in this region is primarily driven by physical processes rather than riverine run off or nutrient input (see comparison with Gulf of Mexico in Sect 4.4) and the details provided for this control. The authors details those physical process for two distinct regions, i.e 1. the southern estuary, where hypoxia is avoided in cases of Kuroshio Subsurface water northward extension and 2. the Changjiang Bank (or northern estuary) where hypoxia occurrence is related to persistent (haline) stratification triggered by the westward spreading of Changjiang diluted waters. Those conclusions are well supported by the summarizing Fig. 9. and form a understanding basis for a more extensive reading of local datasets. The analysis is well documented and instructed, in the sense that observations are described and discussed in the lights of know dynamics of the region rather than passed through automatic statistical procedures. In my view this is positive given the complexity of local circulation features. The abstract gives a clear summary of the results and conclusions. I advise the publication of this manuscript, after considering of the few minor revisions listed below.

R: The reviewer provides concise summary of our study and we greatly appreciate the very encouraging comments. Following the reviews of this and the other reviewer, we have significantly revised the manuscript through improving presentation and analysis. We hope the reviewer find the revised manuscript satisfactory.

Major comments. Sect 4.4 I think the discussion should include comments on the different timescales considered. Biogeochemical and physical drivers does not play on the interannual variability of hypoxia occurrences at the same time scales. Another issue is that the gulf of Mexico and the East China Sea differ by their openness, which might changes the relative importance of physical and biogeochemical drivers.

R: Thank you for the suggestion. In the revised section 4.4, we have added discussions on interannual variation of hypoxia and the distinction between the Gulf of Mexico and the East China Sea in terms of the potential influence of their openness.

C2

Minor Comments. L62. "the influence of pycnocline on the spatial variation of hypoxia" -> the relationship between the pycnocline location? and spatial variation of hypoxia ?

This sentence is changed to "Zhu et al. (2015) emphasized the occurrence of hypoxia related to the presence of pycnocline".

L70 extra space in "t hat"

Revised.

L73 Can you give reference for the blocking of oxygen exchanges by ocean eddies? if not, remove.

We have removed the mentioning of eddies.

L103 sensor -> sensor

Revised.

L111 references needed for the "investigation standards"

A reference has been added.

L112 pycnocline -> pycnocline

Revised.

L148. Either "reached 30m at station K3", or " reached 20-30 m from stations K2 to K6"

This sentence has been rephrased as 'the thickness of the hypoxia water column reached 20-30 m from stations K2 to K6,...'.

L166.and Fig 8 can you give more references or the method used to locate the frontal zone.

More references related to the tidal fronts have been added in Section 2.

C3

L172 oxygenate aeration -> oxygenation or ventilation

Revised.

L176. Reference for characteristic oxygen concentrations of the KSW.

The related references have been added. We re-check the references and revised the characteristic oxygen concentrations of the KSW to be about 5.0-6.0 mg L-1.

L184 Tsushima strait is not on the map Fig1.

Thanks. It is now on the revised Fig 1.

L191. "was consistent"

Revised.

L201 rephrase "the persistence of stratification was insufficient for oxygen consumption"

This sentence has been changed to 'In May, the cumulative oxygen consumption was insufficient to cause low values of DO, despite of the development of stratification,'

L204 "DO was rapidly consumed" -> "was rapidly depleted".

Revised.

L216 rephrase: "The absence of DO-rich water input from upstream led to .. "

Revised.

L217 "rest" -> "other"

Revised.

L243 remove the uppercase from Log and put N2 inside ()

Revised.

C4

L259 "was far more less" -> "was lower by far"

Revised.

L273 needs -> requires

Revised.

L286 remove "of"

Revised.

L296 involve -> evolve

Revised.

L305 last sentence has to be rephrased to something like "Our conclusions could support the prediction of hypoxia based on the evolution of bottom and surface salinity"

The last sentence has been changed to 'We hope that combining analyses of observational data and modelling results shall eventually lead to better prediction of the spatial and temporal variations of hypoxia.' References : Chen et al is 1988 on L.29 and 1998 in the references; Zhao et al 1985 not referred to in the manuscript. Revised. Thank the reviewer again for the very critical review.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2016-59/nhess-2016-59-AC2-supplement.pdf>

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