

Interactive comment on “Phytoplankton productivity and rapid trophic transfer to microzooplankton stimulated by turbulent nitrate flux in oligotrophic Kuroshio Current” by Toru Kobari et al.

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Received and published: 18 December 2019

Phytoplankton productivity and rapid trophic transfer to microzooplankton stimulated by turbulent nitrate flux in oligotrophic Kuroshio Current by Kobari et al.

This manuscript suggests the potential mechanism to explain the biological richness (higher trophic level food web) of Kuroshio based on the indirect experimental results of cultured growth rate estimated by size fractionated Chl.a and mortality estimated by grazing pressure of microzooplankton. These indirect approaches are interesting and

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might be valuable, however I think further explanation or evidences are necessary to make readers agree to the authors conclusion. I also agree with this manuscript for the possible publication in Biogeosciences after moderate revision. The substantial comments are as follows:

Introduction 1 The current version looks too simply. Why don't authors add the research background of this study citing references? For example, the importance of fish resources from Kuroshio is not described in this version and the significance of fish catch in the Kuroshio to the entire the North Pacific or global. In addition, what kind of lower trophic level organisms compose of assemblages of phytoplankton and zooplankton in the study area? What nutrient regulates the primary production in this study area N? or P? Etc. . . . 2 Nutrient supply mechanism by turbulent mixing or other physical processes should be more explained citing references, because there is a large gap between the paragraph 1 and 2 in the current introduction. 3 Why is Tokara Strait important in the Kuroshio track area? Is there any geographical characteristics or bottom topographic characteristics? Is the area of Tokara Strait hot spot of turbulent mixing? Is there any other hot spot of turbulent mixing in the Kuroshio track area? Please explain the above questions in the revised manuscript because the readers who are not familiar with Kuroshio and the North Pacific would not understand the significance of research of Tokara Strait.

Results 1 The manuscript described that nitrate flux induced by turbulent mixing at the subsurface Chl maximum was observed as 0.788 mmol m⁻² d⁻¹ in the Tokara Strait (150 km wide) and authors assumed that the same concentration was kept during 5 days. What potential physical mechanism does keep almost same nitrate concentration at the Chl maximum layer during week? 2 In terms of gradient enrichment experiment and dilution experiment, the please add further descriptions of the details e.g., methods themselves and what purpose are achieved by these methods etc. 3 Lines 161-167: I could not understand what authors would like to describe in this paragraph. Especially, the sentence of the line 163 (To explain ...) seems quite to be abrupt. The more

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explanation needs for Fig. 5. Does the fig 5 show the data comparing among all stations? Why can the Fig. 5 be used to explain the difference in growth rate of size fractionated Chl. a among stations? Please explain more details of the similarity or difference of characteristics among stations. In addition, no Supplement Fig.1 is attached in the manuscript.

Discussion 1 Line205: Why is microzooplankton standing stock in the Tokara Strait of the Kuroshio track low, although the grazing pressure of phytoplankton by microzooplankton are relatively large? Is there any evidence or previous studies to indicate the rapid energy transfer of the microzooplankton to larger size organisms? Please give the potential mechanism in the revised version. 2 Line219-220: The sentence of this line is abrupt because there is no evidence or discussion in terms of the large variation in microzooplankton standing stocks among stations.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-377>, 2019.

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