

***Interactive comment on* “Phytoplankton growth and physiological responses to a plume front in the northern South China Sea” by Qian P. Li et al.**

Anonymous Referee #3

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The manuscript investigated the responses of phytoplankton growth and community size structure to a plume front through hydrographic measurements and nutrient-enrichment experiments in the coastal water west of Pearl River Estuary over the Northern South China Sea shelf. Field surveys from spring to summer indicated that the frontal system was affected by both river plume and coastal upwelling through analyzing temperature, salinity, etc. Some field experiments were designed to assess nutrient limitation for phytoplankton growth by addition of inorganic nutrients, and the influences of plume water and upwelling on phytoplankton community structure and productivity. They found that phytoplankton productivity on the shore-side of the front showed P-limitation, while N-limitation on the seaside. Plume waters and bottom waters would largely contribute to the phytoplankton productivity and impact

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community size structure. The authors have done many works to implement the study of phytoplankton growth responses to plume front, while they just simply summarized what they did without comprehensive discussion. I do have two main criticisms: 1) the nutrient concentrations were not measured to assess nutrients uptake by phytoplankton in the shipboard incubation experiments, and 2) the incubation bottles with smaller volume. The phytoplankton in culture media with smaller volume would be diluted by addition of plume waters and bottom waters, and the water sample could not be enough to get chl a samples. I do not think incubation experiments lasted for two days was enough to evaluate the phytoplankton growth to inorganic nutrients because the culture time is too short. Other comments: 1) In the manuscript, there were no parameters concerning physiological response. 2) P6, line 1-2, the descending salinity would have obvious effect on phytoplankton growth, and the paper didn't evaluated the direct effects of salinity. 3) P8 line 16 delete "of" 4) The incubation site S8 was not marked in Figure 1. The hydrographic and biogeochemical properties of S8 were not mentioned too. 5) In Figure 1 the white salinity lines were marked as 22 and 32, which were described as 26 and 32. 6) In Figure 2 "A Temperature vs. Salinity diagram during May-June 2016" should be corrected as April-June 2016.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2017-495/bg-2017-495-RC3-supplement.pdf>

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