

## ***Interactive comment on “Lytic viral infection of bacterioplankton in deep waters of the western Pacific Ocean” by Y. Li et al.***

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Interactive comment on “Lytic viral infection of bacterioplankton in deep waters of the western Pacific Ocean” by Y. Li et al. Y. Li et al. Ruizhang@xmu.edu.cn

Response to general comments of referee 1: The viral production rates are mainly dependent on the presence of a suitable host. While the host abundance (in this case prokaryotes and pico-phytoplankton in surface) depends on multiple factors such as inorganic nutrient, DOM, physico-chemical characteristics. I strongly suggest that the authors improve the statistical analysis to support their conclusions on which are the main factors controlling the viral abundance and production in these two transects. A simple correlation analysis is not sufficient to explain the complex relationship between prokaryotes and viruses throughout water column; multiple factors need to be taken in

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account simultaneously. Thus, I strongly suggest the authors to implement the statistics with any kind of multivariate analysis (multiple regression analysis, DISTML test, Path analysis). Any of these approaches can help you to identify the best set of variables explaining the variation of the viral and bacterial parameters in your system. Hence, the authors should refocus the manuscript stressing the main findings obtained after conducting the multivariate analysis. Response: We totally agreed with the referee that the multivariate analysis is necessary to elucidate the relationship between viral parameters and environmental factors. In the revised manuscript, we will perform DISTLM analysis in PRIMER 6 software and revise the results and discussion accordingly.

Response to specific comments of referee 1: Page 3, Line 15-20. Please rephrase the sentence. Response: Sentence revised.

Page 3, Line 20-23. This sentence can be deleted from the manuscript. Response: Revised as suggested.

Page 7, Line 6. PSU is not an international scientific unit and its use is not recommended, salinity does not have units. Response: Revised as suggested.

Page 7, Line 26. Please change “bathypelagic sea”. Response: Revised as suggested.

Page 8, Line 12-16. The authors mention some correlations between viruses and inorganic nutrients. As stated above, viral abundance and production are mainly dependent on the availability of a suitable host, thus inorganic nutrients do not have a direct influence on the viral parameters. Which would be the mechanism for this relationship? How nutrients will affect viruses? Response: We agreed that there is no direct influence of inorganic nutrients on viral parameters. However, nutrients might indirectly affect viral parameters (e.g. production, see Motegi, C. & Nagata, T. 2007. Enhancement of viral production by addition of nitrogen or nitrogen plus carbon in subtropical surface waters of the South Pacific. *Aquat. Microb. Ecol.* 48, 27). Anyway, this part will be revised according to the multivariate analysis results.

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Page 9, Line 17-21. Please see the previous comment. Response: This part will be revised according to the multivariate analysis results.

Page 13, Line1-25. The sentence needs to be rephrased accordingly to the multivariate analysis results. Response: This part will be revised according to the multivariate analysis results.

Page 14, Line 27-29. The paragraph has to be revised in a more concise way. Response: Revised as suggested.

Page 15-16. Please refocus the conclusion accordingly to the multivariate analysis results. Response: The conclusion will be revised according to the multivariate analysis.

Figure 3 could be moved to the supplementary information; additionally you could present a new figure showing the bacterial and viral parameters versus depth. Response: Fig. 3 has been revised as suggested.

Please invert the x-axis on figure 2 (second transect) from 3°N ->18 °N to 18 °N -> 3°N. Response: Fig. 2 has been revised as suggested.

The manuscript would also benefit from the revision of the English usage. Response: We have corrected all grammatical mistakes suggested by the referees, and have also carefully gone through the manuscript and corrected a few others. In addition, Prof. John Hodgkiss also help us for English usage.

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