

## ***Interactive comment on “A global viral oceanography database (gVOD)” by Le Xie et al.***

### **Anonymous Referee #2**

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Review for “A global viral oceanography database (gVOD)” Xie et al., Earth System Science Data, Dec 2020

#### Summary

The authors have gathered an extensive dataset describing global oceanographic virus abundance and productivity, along with other oceanographic and environmental data (salinity, temperature, etc.). Virus abundance data using three different methods (transmission electron microscopy, flow cytometry, and epifluorescence microscopy) are included in the dataset. Furthermore, data describing lytic virus production using five complementary methods, and lysogenic production using mitomycin C treatments, are included. The authors provide a summary of the geographic patterns evident in their data and use two complementary statistical models to infer global virus abundance and biomass, the latter utilizing a model relating virus carbon content to capsid size. Their

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global estimates are consistent with, and complementary to, prior estimates of global ocean virus abundance. The authors also leverage their new dataset to assess whether complementary methods to infer abundance produce consistent results in similar environments. They find, reassuringly, that different methods to measure virus abundance produce similar results.

#### Main comments

This manuscript has been extremely carefully put-together. I really appreciated the concise explanation of different techniques used, and the clarity with which the results are reported. Clearly, a lot of effort has gone into this work. I enjoyed seeing the methodology used to infer global virus abundance (I always see the  $10^{30}$  number banded around, without knowing how those estimates are reached). I also appreciate that effort has been made to quantify uncertainty in all of their estimates, and to evaluate the consistency of different techniques. Overall, this manuscript is a timely and necessary contribution.

#### Specific comments

Overall, the language is very clear, there are only very minor English language issues. I pointed out a couple, but it could be useful to have one final sweep through to look for language edits.

Line 8: “Virioplankton are a key component of the marine biosphere” (suggested change)

Line 9: “They also contribute greatly to nutrient cycles/cycling” (suggested edit)

Line 21: The link to the database is no longer valid, I understand it was temporary and wouldn't have been an issue if I had done my review earlier. Noting it will need to be updated nevertheless.

Line 88: “For notational simplicity, ” (suggested edit). Also, maybe clarify what FPB stands for? Is it Fraction-Prokaryote-Burst?

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Line 122: consider providing your code used for the modeling, either in a public repository, or as a supplement to the article

Line 210: It looks like the range for lysogenic production goes negative? Is this an artefact or something real? These negative ranges sometimes happen when you take a standard deviation of data that are heavily positive-skew (often the case with biological data). Log-transforming can help (although I see you have done this elsewhere). May be worth commenting on this point to clarify if it is an artefact or something real.

Line 214: update link

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-120>, 2020.