

Interactive comment on “Enhanced viral production and virus-mediated mortality of bacterioplankton in a natural iron-fertilized bloom event above the Kerguelen Plateau” by A. Malits et al.

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Andrea Malits on behalf of the co-authors

We are grateful for the reviewers' constructive suggestions and considered them carefully. All corrections are highlighted in the attached pdf file (track changes mode of the word document). The reviewer's concerns about the terminology are justified and we changed the text in order to be more precise: We agree with the reviewer#1 and replaced "protozoan" and "protists" by heterotrophic nanoflagellates (HNF).

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Flow-cytometric assessment of viral abundances may indeed encompass particles other than viruses. However, as insinuated by the referee #1, bacterial and viral parameters were related significantly (Table 4) and a potential overestimation of viral abundances will probably not change the conclusions of the study. Therefore and for the sake of clarity we prefer to stick to the term virus. We discussed this shortly in the Methods section (P7L13-17).

We are aware of that viral counts by flowcytometry potentially include bacteriophages as well as cyanophages and viruses associated to small eukaryotes. In fact, we avoided the term bacteriophage throughout the manuscript. However, it should be stressed that in the virus reduction approach (VRA), viral counts should mostly include bacteriophages since they comprise viruses released by infected bacteria in a dark incubation of virus-reduced seawater. Cyanobacteria were rare in situ (Gerringa et al., 2008) and not present in the VRA (as assessed by flowcytometry).

We agree with both referees that viruses lacking an own metabolism to reproduce should not be considered as living entities. Therefore we replaced 'living' by 'biological' as suggested by both referees.

Below the comments to the specific questions of referee#1:

It is a common feature that lysogens are induced only in some out of all experiments performed (Boras et al., 2010, Boras et al., 2009, Evans & Brussaard, 2012). The explanation may be the following one and has been added to the discussion (P16L27-P17L7): In natural communities, lysogens are usually induced by mitomycin C in an experimental approach, but not all prophages can be induced by mitomycin C and this inducing agent may be toxic to some bacteria (Paul, 2008, Paul & Weinbauer, 2010). Thus, lysogeny may be present although not detected.

There are some indications that lysogenic infection occurs preferentially in oligotrophic systems (Boras et al., 2010, Payet & Suttle, 2013). Interestingly, we found no difference in lysogenic infections between trophic situations. It was suggested that enhanced

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growth causes temperate viruses to enter the lytic cycle (Wilson and Mann 1997). Both, filtration and incubation could have stimulated bacterial production in the virus reduction approach (Weinbauer et al., 2009) and consequently induced prophages in the Mitomycin C treatment controls. Thus again, the low incidence of lysogenic infection in HNLC waters might be an artifact.

Referee#2: Is it correct that 250 mL seawater was concentrated using TFF or should this read litres? Yes, mL is correct, 200mL seawater was concentrated by means of a VIVAFLOW50 cartridge.

Boras, J. A., Sala, M. M., Baltar, F., Arístegui, J., Duarte, C. M. and Vaqué, D. (2010) Effect of viruses and protists on bacteria in eddies of the Canary Current region (sub-tropical northeast Atlantic). *Limnology and Oceanography*, 55, 885-898.

Boras, J. A., Sala, M. M., Vazquez-Dominguez, E., Weinbauer, M. G. and Vaque, D. (2009) Annual changes of bacterial mortality due to viruses and protists in an oligotrophic coastal environment (NW Mediterranean). *Environ Microbiol*, 11, 1181-93.

Evans, C. and Brussaard, C. P. D. (2012) Regional Variation in Lytic and Lysogenic Viral Infection in the Southern Ocean and Its Contribution to Biogeochemical Cycling. *Applied and Environmental Microbiology*, 78, 6741-6748.

Gerringa, L. J. A., Blain, S., Laan, P., Sarthou, G., Veldhuis, M. J. W., Brussaard, C. P. D., Viollier, E. and Timmermans, K. R. (2008) Fe-binding dissolved organic ligands near the Kerguelen Archipelago in the Southern Ocean (Indian sector). *Deep Sea Research Part II: Topical Studies in Oceanography*, 55, 606-621.

Paul, J. H. (2008) Prophages in marine bacteria: dangerous molecular time bombs or the key to survival in the seas? *Isme J*, 2, 579-89.

Paul, J. H. and Weinbauer, M. G. (2010) Detection of lysogeny in marine environments. In: C. Suttle, S. W. Wilhelm and M. G. Weinbauer (eds) *Manual of Aquatic Viral Ecology*. ASLO, pp. 1-8.

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Payet, J. P. and Suttle, C. A. (2013) To kill or not to kill: The balance between lytic and lysogenic viral infection is driven by trophic status. *Limnology and Oceanography*, 58, 465-474.

Weinbauer, M. G., Arrieta, J. M., Griebler, C. and Herndl, G. J. (2009) Enhanced viral production and infection of bacterioplankton during an iron induced phytoplankton bloom in the Southern Ocean. *Limnology and Oceanography*, 54, 774–784.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/11/C5715/2014/bgd-11-C5715-2014-supplement.pdf>

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