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Interactive comment on "Acquisition of intact polar lipids from the Prymnesiophyte *Phaeocystis globosa* by its lytic virus PgV-07T" *by* D. S. Maat et al.

Anonymous Referee #1

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In the manuscript "Acquisition of intact polar lipids from the Prymnesiophyte *Phaeocystis globosa* by its lytic virus PgV-07T," Maat et al. report the intact polar lipid content of a host-virus system during infection. Previous work by Vardi et al. (2009) on *Emiliania huxleyi*, also a Prymensiophyte, showed that production of a distinctive glycosphingolipid (GSL) termed viral GSL (vGSL) was initiated by viral infection. Thus vGSL was proposed as a biomarker for E. huxleyi infection, and it may occur in other similar host-virus systems as well. Maat et al. determined that vGSL is not present in an infected culture of *P. globosa* or its virus. This is a useful report in that it shows that GSLs may not be active components in *P. globosa* infection even though PgV-07T, like the *E. huxleyi* viruses, is surrounded by a lipid envelop. It is unknown how widespread vGSLs

are among infected Prymnesiophytes. This study is limited, as it documents only one additional Prymnesiophyte species and only used one model host and virus strain. The manuscript is well written, easy to understand and broadens our understanding lipid content and behavior in algal virus infection. It is relevant to the Biogeosciences readership, but is really the bare minimum data set for publication and lacks breadth for making broad conclusions about Prymnesiophytes as a whole. Is it possible that *E. huxleyi* is more representative and that *P. globosa* is an outlier.

Comments:

Section 2.6

Why were the filters containing cells freeze-dried? It seems that one of the benefits of the single phase liquid extraction method is that frozen filters can be extracted quickly with minimal sample preparation that could affect lipid distributions. Pitcher et al. (2011) was referenced for the extraction protocol, but their manuscript did not justify freeze-drying, only reported it. Pitcher et al. (2011) referenced Schouten et al. (2008) for the extraction protocol, but the 2008 manuscript did not report freeze-drying.

Section 3.2

Can the authors provide any details at all about the GSLs that were detected in *P. globosa*? Vardi et al. (2012) provided detection parameters for a host GSL in *E. huxleyi* with some distinctive mass spectra. Did the authors detect hGSL or some other GSL class? In Fig. 4 a GSL peak is noted in all four chromatograms. Is that always the same compound(s)? Is there any change in ion m/z distributions during infection? As Maat and coauthors targeted GSLs for this manuscript, it would be nice to see a description of what they detected.

Section 4.1

The authors state that no data have been published on the fatty acids of infected *P. globosa*. Using their mass spec data, can the authors at least predict total numbers of

carbon atoms and double bonds on the fatty acid moieties for the different species of IPLs? This could be provided as a supplement if it is not deemed useful to their lipid description in the manuscript.

Section 4.2

The authors used chloroform and diethyl ether to remove the lipid envelope from PgV-07T then reported that the virus was no longer infective, concluding that the membrane was crucial for infection. Please include a citation for this treatment or experimental data showing that other, non-enveloped virus that have been treated with chloroform and diethyl ether remain infective.

Table 1.

How similar are the ionization efficiencies of the IPLs? For example, can it be concluded that SQDG is always less abundant that MGDG and DGDG in the experiments, or is it just more difficult to detect using ESI-MS? Please provide a statement on relative ionization efficiencies to make this limitation clear to readers not familiar with quantification by MS.

Fig. 4

Based on relative retention times, the MGDG distributions in infected and noninfected cultures appear to be a little different. Is this significant? Is there a shift in fatty acids?

Interactive comment on Biogeosciences Discuss., 10, 11705, 2013.