Comment on bg-2022-128

Anonymous Referee #2

Referee comment on "How biogenic polymers control surfactant dynamics in the surface microlayer: insights from a coastal Baltic Sea study" by Theresa Barthelmeß and Anja Engel, Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-128-RC2, 2022

Riview of „How biogenic polymers control surfactant dynamics in the surface microlayer: Insights from a coastal Baltic Sea study " by Theresa Barthelmeß and Anja Engel.

This is a well written manuscript focusing on the possible biogenic sources of surfactants in the surface water in the restricted, local area at a coastal Baltic Sea site. The authors aimed to explore which biopolymer composition controls surface activity, focusing on the amino acids and carbohydrates as the main components of phytoplankton derived organic matter.

In Introduction, the authors made a clear identification of the gap in the knowledge to which their scientific questions are based on. In order to collect representative samples of the surface water, a considerable attention was paid to the sampling of the SML and the seawater samples collected during 2 cruises (in June and September) covered two different seasonal regimes. In addition, besides the main idea of the seasonal effect, the authors also considered the potential diurnal effect and the effect of the meteorological conditions on the microbial community and consequently the surfactant concentration and composition.

Furthermore, all protocols are well described and can be easily followed. In order to better understand potential correlation with surface concentration, the bulk organic matter concentration as well as auto and heterotrophic community composition was studied.

The statistical analysis of the obtained data set was preformed in detail indicating which components contribute the most to the surface activity of the coastal area of the Baltic sea. More specifically, the statistical analysis performed and results discussed here seem to be an importatnt step towards understanding the selective accumulation of compounds (and microbes) which impact the physico-chemical properties of the SML and consequently the heat, momentum and mass exchange between the air and the sea. A lively interplay

between phyto- and bacterioplankton community is well described in the discussion which is strongly connected with the release of labile to semi-labile components and surfactants from the cells into the environment. Furthermore, the authors conclude that that phytoplankton products contribute substantially to the surfactant stock but their release mechanisms and microbial turn-over times control surfactant concentration rather than incident phytoplankton production.

The main idea of this manuscript is clear and the results are presented clearly and in detail in all Figures as well as in Tables.

Generally, I find the idea, the data and discussion to be very interesting and in my oppionion the manuscript fits well within the scope of Biogeoscicences. I agree with the authors that conducting this kind of studies in order to better understand the consequences of surfactant concentration and composition variability in the SML is crucial for future climate predictions, especially nowadays, when the impacts of climate change are global and unprecedented.

Technical comment:

L 521: the reference title formatting is inconsistent with others