

Interactive comment on “Arctic (Svalbard Islands) Active and Exported Diatom Stocks and Cell Health Status” by Susana Agustí et al.

Anonymous Referee #1

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The manuscript describes the health status of diatoms during the course of the bloom in the Arctic. The main finding is that when diatoms are dying they sink out of the photic zone. Two main types of results are described here. First a clear and complete description of the diatoms in 8 stations around svalbard, and second an experiment testing the decay of diatoms in the dark, while comparing the sinking of living versus dead diatoms. While I feel that these data are very intersting, the findings are not new and should have been presneted with others in order to give a valuable manuscript. The discussion is a little weak and rely a lot on the paper by Krause et al. For example, the discussion starts saying that diatoms in Arctic are limited by silicates and that silicates depletion is the driver of diatom death and sinking which is a result from the study by Krause et al. 2018. Why didn't you use the results of this study regarding the survival

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of diatoms in the dark? Can't it be one of the trigger if the mixing increase? The paper states that the average life of the diatoms in the dark is slightly superior than a day. In this part of Arctic I guess that there is strong mixing. How long are the diatoms kept in darkness due to mixing? The data from station 9 (polar front) showed indeed that there is an effective mixing (similar diatom concentrations and % of living cells in photic and aphotic samples), however, the % of living cells is still high. How do the authors explain that?

The different stations are ideally located and sampled to describe the diatom bloom from the initiation to the decline, but these could be more interestingly discussed in the paper. What can be brought to light from the results of this paper?

What is the bloom status at each station at the sampling time? this could be a lot more discuss using diatom cell concentrations in photic and aphotic zone, % of living cells, nutrients concentrations.... How are the nutrient concentrations compared to the winter concentrations ? that may give an idea of the bloom advancement. How is the bloom terminate? Why these data are not in the paper by Krause et al if it uses so much of the conclusions issued from it? Alone I feel that these data even if very interesting are too poor. What are the limitations there? Why do the authors state that there is only silicate limitations and not nitrate while nitrate are also very depleted in some zone (station 6, 7 and 8) It would have been great to discuss them in light with production rates, limitations or sinking fluxes of bSi or POC from sediment traps data.

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