

Interactive comment on “On extreme atmospheric and marine nitrogen fluxes and chlorophyll-a levels in the Kattegat Strait” by C. B. Hasager et al.

Anonymous Referee #1

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On extreme atmospheric and marine nitrogen fluxes and chlorophyll-a levels in the Kattegat Strait By Hasager et al.

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General comments The paper by Hasager et al. addresses algal bloom, an important phenomenon. In the paper the results of a multidisciplinary study in which atmospheric deposition events are linked to the occurrence of algal blooms. It is an interesting paper that could be published in the Journal of Atmospheric Chemistry and Physics. I don't consider myself an expert on algae bloom or remote sensing. My main focus is on air pollution and atmospheric deposition. Please realize this when reading my comments. I have some general comments here, more specific comments below and finally a few typos. Especially in view of the last items it certainly would have made life easier if

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page numbers and line numbers had been used.

The paper seems original to me, the originality of the paper being not so much the atmospheric side but the multidisciplinary approach. The paper does not have a clear scientific structure. It is clear when extreme events in atmospheric deposition and deepwater entrainment are discussed in relation with algal blooms. The algal blooms are detected by remote sensing. But the position of the discussion of other measurements is not so clear. It is not completely clear to me what the purpose of the various measurements is. Please start the result section with an overview why all these issues are discussed why all these measurements are presented in this context. For example: How does spatial variation of Ca fit in the paper? What do the large differences shown in Figure 8 tell us? I think the paper needs a clear story line here. It is no problem that this is presented, it is only unclear where it fits in. The paper needs also firm conclusions. Do the authors believe that either atmospheric deposition or deep-water entrainment is the process that is causing algae blooms or neither?? If they have a point to make here, it could make it easier to have a story line.

Specific comments - The paper reads quite well. The introduction is clear but I think for the readers of this journal it would be better to expand the explanation of the processes leading to algae bloom. For example the first lines of chapter 3 and the last sentence of chapter 2 could be added to the intro. This would improve clarity - Page 4 What is the requirement from NASA? - Page 8 paragraph starting with The daily deposition sampling system could better be moved to the methods sections earlier in the paper. - Many people know the closed system as a wet only sampler. Please change. - In chapter 5.5 page 12 second paragraph starting with An input is \dot{E} should be moved to somewhere else. - Page 8 Note that an open collector also collects an (unknown) amount of dry deposition. - Page 10 perhaps a reference to a standard paper that shows that nutrients are depleted in some water layers - Chapter 5.4 When is a Ca level interpreted as a bloom event? - Page 12 The results of Hasager et al. 2003 seem quite relevant to this paper. It is a pity that so little of these results are presented here.

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A graph of the correlation could help. I find the description of the results from this study rather vague. What are the chemical conditions? This paragraph is not so clear. The daily model results may have been too coarse. So what do the newer results tell us??? And perhaps there is a strong correlation between wind speed and rainfall amounts, - Figure 4 Legends The text talks about frequency, the legends don't. Moreover not everyone may be able to locate the Kattegat etc. in this graph. Please improve. - Table 3 I see, at first glance, no correlation between any of the columns. I think the authors should comment on that in the text. - Same with Figure 8 There seems no correlation at all, I am afraid. This is commented in the text I realize that. But what does it mean in the context of this paper.

Corrections - There are many errors with plural and single forms of verbs. - Several positions Fluorimeters should that not be Fluorometers??? (same with fluorescence (correct) and fluorescence (wrong)) - Page 2 last paragraph of chapter 1 extreme events is described - Top page 3 inter annual variations \ddot{E} is (are) found to vary. Also weak English here: In one sentence: double: vary and variations. - Bottom page 4 HPLC and HPCL - As far as I know native speakers may argue that bi-monthly means twice a month whereas two month averages are meant. - Chapter 5.2.1 first paragraph and it is seen - Chapter 5.2.1 just above 5.2.2 dail-1 should be day-1 - Page 10 When the wind speed increase. - Bottom 13 biomass rather than biomass - Page 15 Paragraph starting with The 10 year reoccurrence values \ddot{E} are rather than is . Three lines below that same problem.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1651, 2003.

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