

Interactive comment on “Environmental control on the variability of DMS and DMSP in the Mauritanian upwelling region” by C. Zindler et al.

C. Zindler et al.

czindler@ifm-geomar.de

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We thank referee #2 for their useful comments and advice. We added the missing information and clarified some misunderstandings. Additionally, we revised our figures 5 and 6 and present the data in one figure in a better arrangement.

R2: 1. The same DMS and DMSP data are presented in both Figure 5 and figure 6. That is not acceptable. A: The Referee is right. We changed the figures.

R2: 2. 8594-L15. Have the authors tested whether storing water samples at 4 °C affected the DMSP/DMS pools? This would be a significant thermal shock for organisms used to 17- 22 °C. I have found that chilling samples can cause major release of DMS and dissolved DMSP in some plankton communities. A: Thanks for this advice. We

considered the chilling effect during the sampling procedure. We decided to keep the samples dark and cold instead of storing them in a closet in the lab with surrounding air temperature of around 30°C. We compared the cold samples with warm samples from the same CTD and did not find a significant difference between the two different treatments. Furthermore, we only kept 10% of all samples in the fridge, mainly when the time between two sampling stations was too short to measure all taken samples. We changed it in the ms: Samples were measured immediately after sampling. However, during times with a high sampling frequency a few samples were stored in the dark at 4°C and measured within 4 hours after sampling.

R2: 3. 8594-L17. Please give the volume of water that was syringe filtered? A: 25ml was filtered and measured, added in the ms

R2: 4. 8595-L1-2. The procedure described, of analyzing “alkalinized unfiltered seawater” would not yield DMSPp. It would yield total DMSP+DMS. This would then require subtraction of independently determined [DMS] and [DMSPd]. A: We did not mention this in the ms but we got the concentrations of DMSPp exactly this way. And additional explanatory sentence was added: To obtain the final DMSPp values the DMS and DMSPd concentrations were subtracted.

R2: 5. 8597-L19. I don't understand why the freshly upwelled water is “only 20 deg C”, which is higher than the “aged” water which has been at the surface and is 19 deg C. Should not the upwelled water be colder than water that has been at the surface for some time? A: Along the Mauritanian coast the upwelling is seasonal and expanded southward during winter and spring time of the northern hemisphere. Thus the upwelling plumes in the south are younger in general. When the upwelling starts, water from deeper water layers is brought to the surface. However, this water is from shallow depth not from the max depth for upwelling. With ongoing upwelling water from deeper depths is brought to the surface and thus further decreases surface water temperature. Additionally, when deep cold water starts to ascend and get mixed with warm surface water the temperature of young upwelling plumes are warmer at the surface than

of upwelling plumes which had more time to cool and replace warm surface water.

R2: In this same line, it is confusing when they say that the upwelling “was most advanced”. To me, advanced upwelling implies that the water has been at the surface for a while. Yet I don’t think that is what they mean. I think they mean that the contribution of upwelled water was most significant close to the coast at 18 N (as indicated by the cooler 18 deg temperature). Please clarify. A: The referee is right that we mean that the contribution of upwelled waters was most significant. We defined “most advanced” upwelling regions which are influenced by ascended bottom water and these regions showed most intensive upwelling.

R2: 6. 8598-L24. Is it a general consensus that the reason cyanobacteria dominate oligotrophic regions is that they can use organic nitrogen compounds? A: Zubkov et al., 2003 found that cyanobacteria are competitive dominant in oligotrophic waters due to their ability to take up about 36% of organic nitrogen pool. It is right that this is not a general consensus, however, the N-fixation ability of cyanobacteria and thus their advantage in oligotrophic regions is generally known. We added this information in the ms.

R2: 7. 8599-L23. Give DMS concentration range. 8. L28. Give DMSPp concentration range. A: Is shown in Tab. 1 and added in the ms.

R2: 9. L29. The final sentence of this section “However, the hidden bias: : :” is confusing and really doesn’t really add anything. I recommend deleting it. A: done

R2: 10. 8603-L10-14. It seems a rather strong conclusion considering the data. A: We attenuated our conclusion.

R2: 11. As set in the discussion paper, several of the figures are too small to be seen in a meaningful way. When looking at a printed version, the details in Figure 3 are very hard to see. Figure 5 and 6 are nearly impossible to see and various plots within each panel just look like a jumble of points. Even when looking at the pdf and blowing it up,

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it is hard to see Figure 5 & 6. A: The referee is right. We have changed the figures.

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