

Dimethylsulfide (DMS) and Dimethylsulfoniopropionate (DMSP) in the Mauritanian Upwelling (NW Africa)



Cathleen Zindler (czindler@ifm-geomar.de), Ilka Peeken* and Hermann W. Bange

IFM-GEOMAR, Leibniz Institute of Marine Science (at Kiel University), Germany; *Alfred-Wegener-Institut of Polar and Marine Science, Bremerhaven, Germany

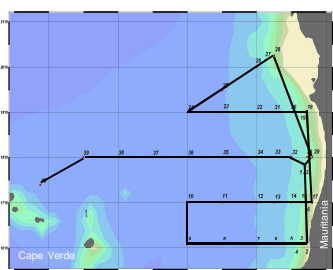
Introduction

- Measurements of dissolved DMS and DMSP in surface seawater during the SOPRAN cruise ATA-03 in the eastern tropical North Atlantic Ocean in February 2008 are presented
- During ATA-03, nutrient rich upwelled water triggered a phytoplankton bloom dominated by diatoms along the Mauritanian coast

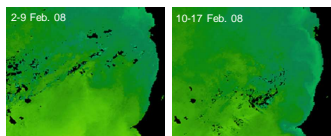
Conclusion

- The patchy distribution of DMSP producing algae was roughly consistent with the distribution pattern of DMSP and DMS
- The DMS distribution was also partly dependent on the grazer abundance and senescence of phytoplankton
- Along the 18° N transect the phytoplankton abundance and DMS(P) concentration decrease with distance to the coast

The Mauritanian Upwelling region



The sampling site of the ATA-03 cruise on the R/V Atalante, 3rd to 20th February 2008



Southward shifting of the upwelling area during the ATA-03 cruise

The phytoplankton and DMS(P) distribution of the sampling site

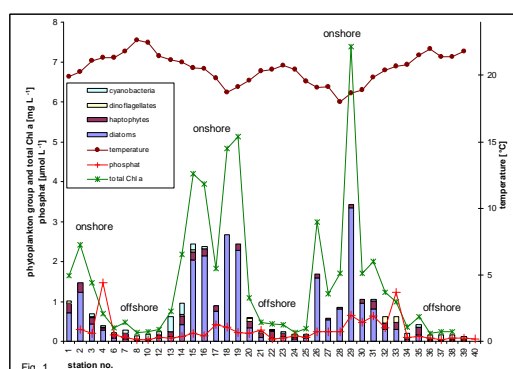


Fig. 1

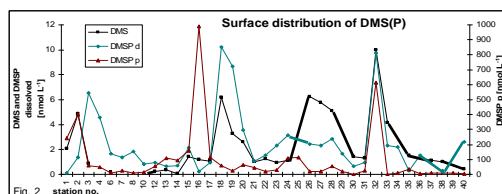


Fig. 2

Distribution of DMSP producing algae

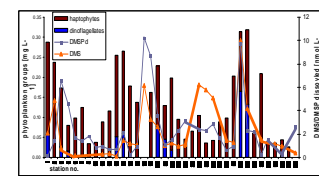


Fig. 3

Distribution of grazer and senescence indicators

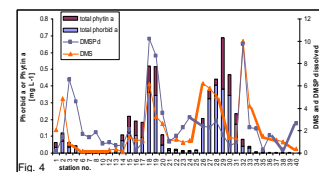


Fig. 4

DMS and DMSP peaks coincidence with high dinoflagellates and haptophytes abundance as well as with high grazer pressure and with aging of the phytoplankton

- The upwelling area along the Mauritanian coast is a dynamic system due to its southward expansion during the ATA-03 cruise
- The induced phytoplankton bloom was mainly dominated by diatoms whereas dinoflagellates and haptophytes were more abundant in areas of upwelled water mixed with oligotrophic open ocean water; cyanobacteria were dominant in oligotrophic offshore regions → a succession of phytoplankton composition dependent on the nutrient concentration (Fig. 1)
- Elevated dissolved DMS(P) concentrations was mainly dependent on dinoflagellates abundant (Fig. 3)
- DMS concentrations were also elevated in areas with high grazer pressure and high abundance of aged algae - this is probably due to enhanced release of algae DMSP which is used as a nutrient by bacteria, a process at which DMS can be produced

The 18° N transect

- Along the 18° north transect diatoms dominated the coastal area of the upwelling region whilst haptophytes and dinoflagellates were more abundant further offshore where also DMS(P) was highest concentrated
- In the open ocean phytoplankton abundance and DMS(P) concentrations were low

The Phytoplankton distribution from the coast to the open ocean

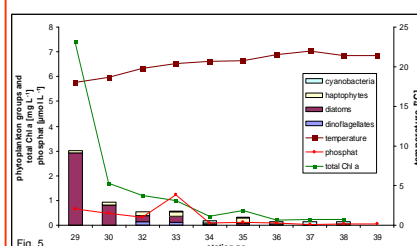


Fig. 5

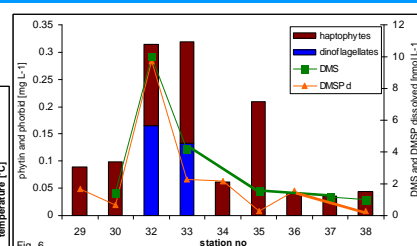


Fig. 6

Distribution of the DMSP producing algae and of the dissolved DMS(P)