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# The influence of dissolved organic matter on the marine production of carbonyl sulfide (OCS) and carbon disulfide ($CS_2$) in the Peruvian upwelling

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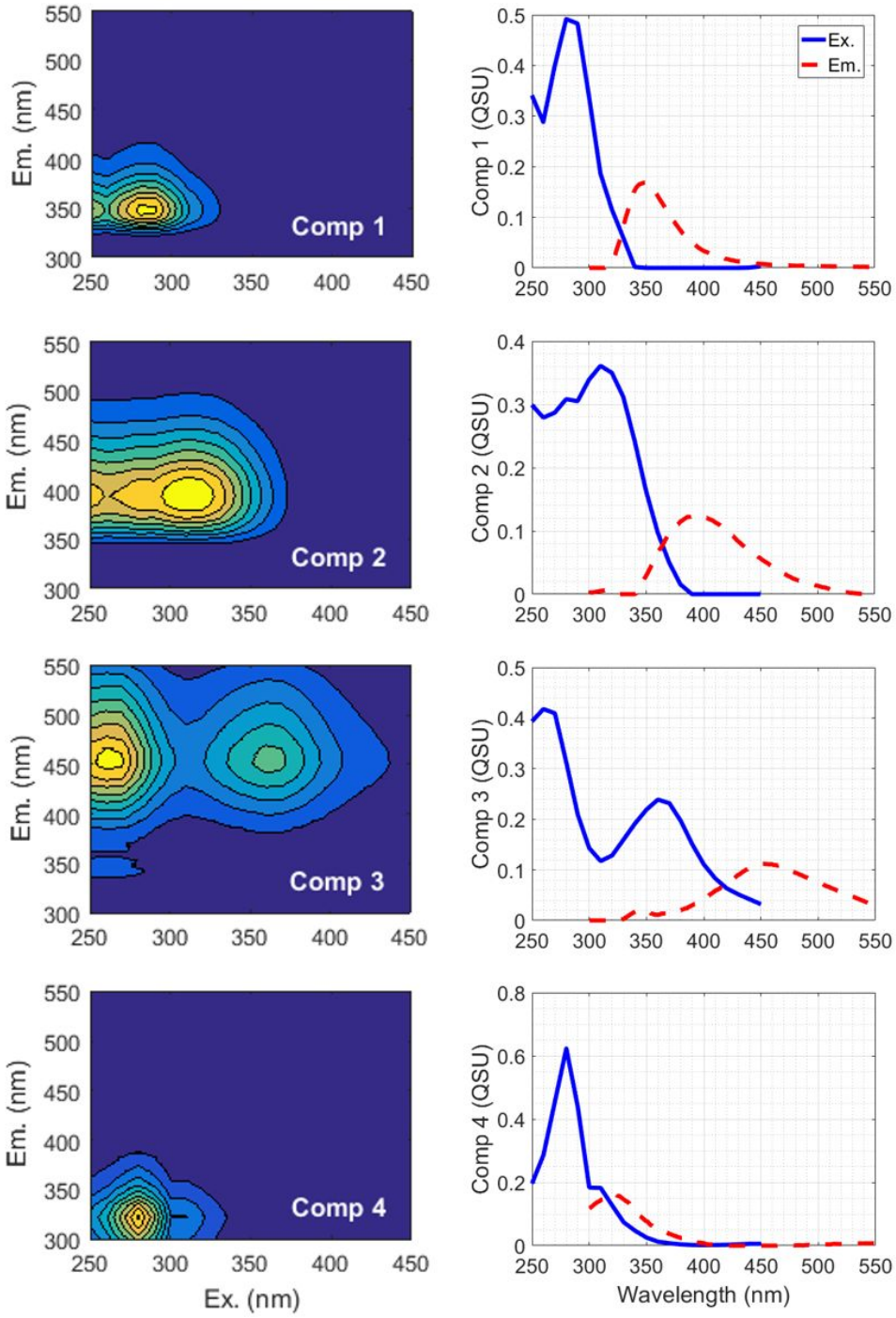
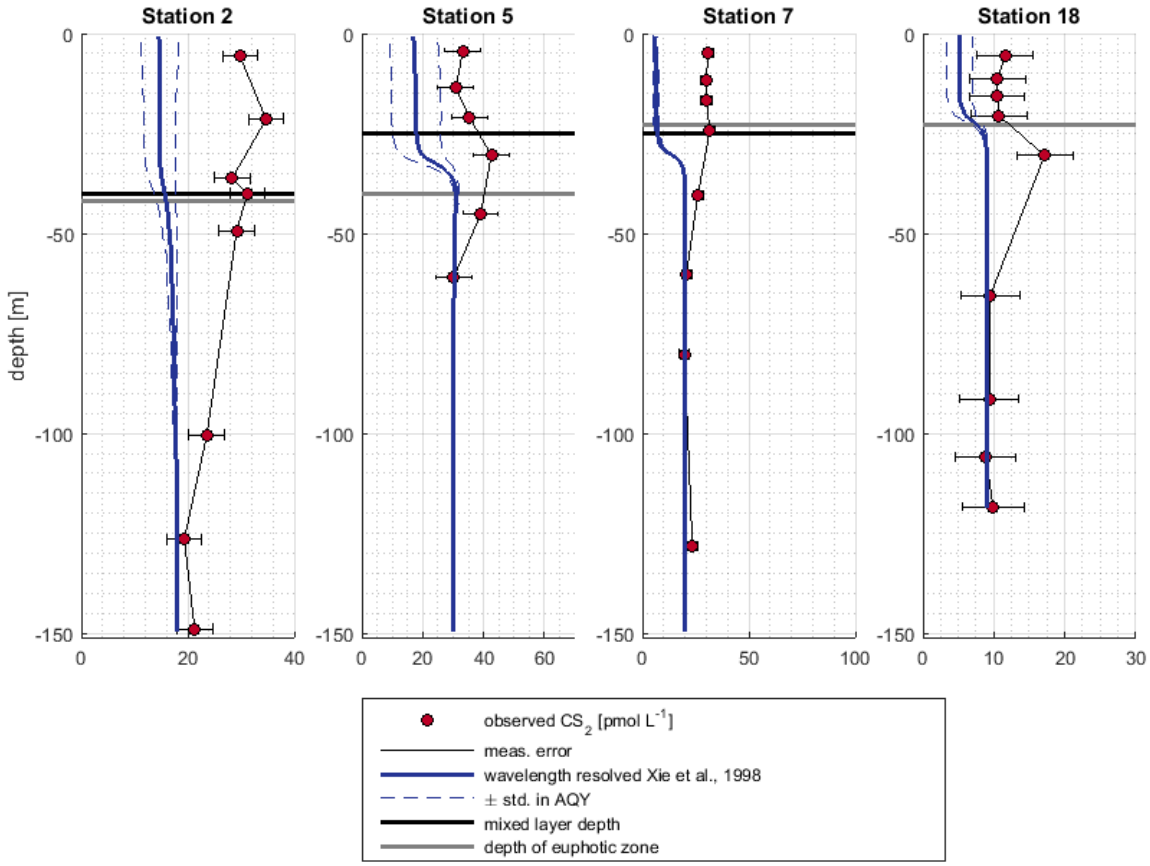
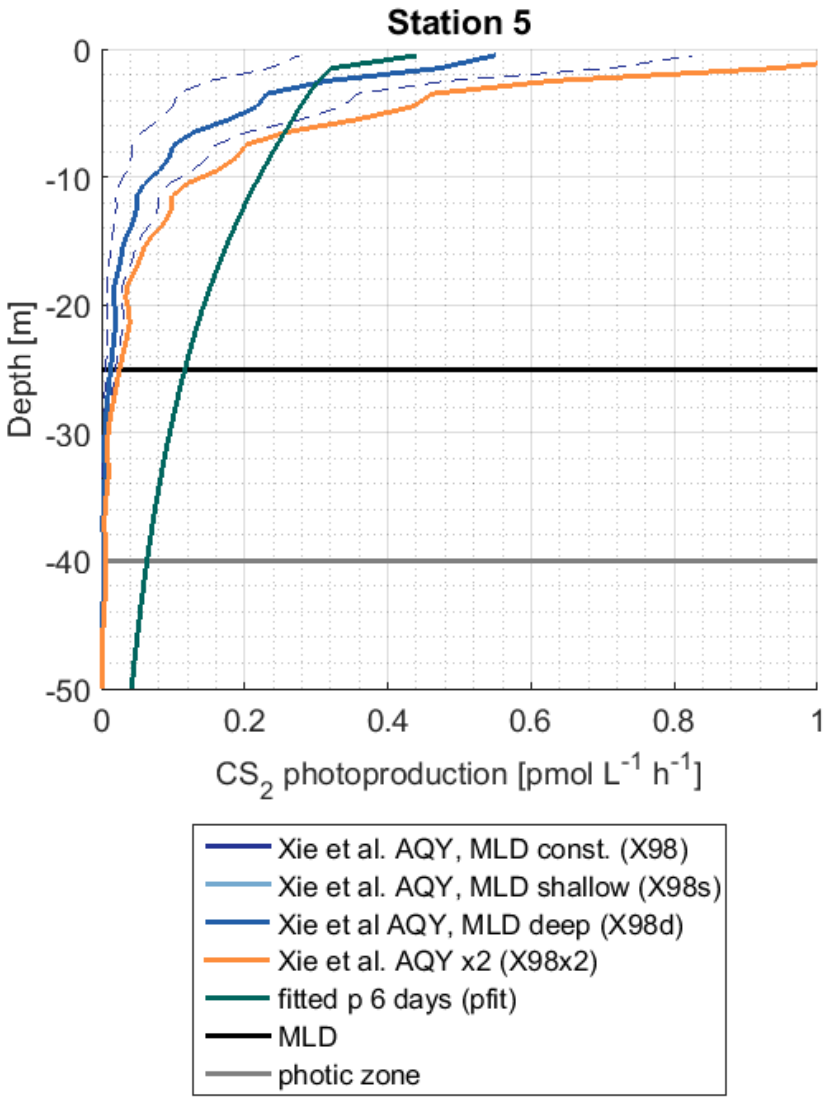



**S-Figure 1:** Three-dimensional fluorescence landscapes (left) and the excitation and emission spectra (right) for a four component model derived from PARAFAC analysis for fluorescent dissolved organic matter (FDOM). C1 and C4 fluoresce in the UV range and represent protein-like fractions, whereas C2 and C3 fluoresce in the visible range and represent humic-like fractions of the DOM pool.




**S-Figure 2:** Profile measurements of $CS_2$ concentrations and 1D FABM/GOTM model results for the $CS_2$ model experiments using the apparent quantum yield (AQY) reported by Xie et al. (1998). All concentrations in pmol $L^{-1}$.




**S-Figure 3:** Photoproduction for $CS_2$ in the water column in simulations for station 5.

## Tables

**S-Table 1:** Forcing parameter for the box model and the FABM/GOTM 1D water column model.

| Parameter | Box model | FABM/GOTM module |
|---|---|---|
| **CDOM $a_{350}$** | in-situ measurements, 3-hourly measurements | in-situ measurements from CTD casts at stations, constant for the duration of the simulation |
| **UV radiation** | Global radiation from shipboard measurements (10 min. averages), corrected to UV radiation as described in von Hobe et al. (2003) and Lennartz et al. (2017) | 4% of global radiation from the host (GOTM), penetration depth and profile shape from in-situ measurements integrated over the wavelengths 300-400nm |
| **Temperature** | Continuous in-situ measurements, Seabird MicroCat SBE41 | In-situ measurements from CTD, constant for the duration of the simulation |
| **Salinity** | Continuous in-situ measurements, Seabird MicroCat SBE41 | In-situ measurements from CTD, constant for the duration of the simulation |
| **pH** | fixed value 8.1 | fixed value 8.1 |
| **Air pressure** | In-situ measurements | In-situ measurements, daily average, constant for the duration of the simulation |
| **Atmospheric mixing ratio** | OCS: sampled onboard, ca. 3-hourly resolution, for quality control: air canister samples analysed at RSMAS (Schauffler et al., 1998; de Gouw et al., 2009)<br><br>$CS_2$: no measurements availabe, assumed mixing ratio of 0 ppt | OCS: sampled onboard, for quality control: air canister samples analysed at RSMAS (Schauffler et al., 1998; de Gouw et al., 2009), daily averages<br><br>$CS_2$: no measurements availabe, assumed mixing ratio of 0 ppt |
| **Wind speed** | measured onboard, corrected to 10 m height, 10 minute averages | In-situ measurements, corrected to 10m height, daily average, constant for the duration of the simulation |
| **Mixed layer depths** | obtained from CTD profiles, using the Lorbacher (Lorbacher et al., 2006) criterion, 0-4 times per day | - |

**S-Table 2:** Model forcing for the simulations in GOTM/FABM.

| | Station 2 | | Station 5 | | Station 7 | | Station 18 | |
|---|---|---|---|---|---|---|---|---|
| | **OCS** | **$CS_2$** | **OCS** | **$CS_2$** | **OCS** | **$CS_2$** | **OCS** | **$CS_2$** |
| location | 0.00° N 85.50°W | 0.00° N 85.50°W | 10.00°S 81.92°W | 10.00°S 81.92°W | 9.18° S 79.46° W | 9.18° S 79.46° W | 15.32 °S 75.27 °W | 15.32 °S 75.27 °W |
| Date of 2015 UTC | 7.10. 16h | 7.10.2015 23h | 11.10. 3h | 10.10. 19h | 12.10. 9h | 12.10. 3h | 19.10. 20h | 19.10. 18h |
| length of simulation [days] | 5 | 21 | 5 | 21, 6 | 5 | 21 | 5 | 21 |
| depth of simulation [m] | 100 | 150 | 150 | 150 | 120 | 150 | 120 | 120 |
| SST [°C] | 24.3 | 20.5 | 20.6 | 20.6 | 20.1 | 20.1 | 15.6 | 15.71 |
| average T [°C] | 21.1 | 19.3 | 17.5 | 17.6 | 17.9 | 17.3 | 14.7 | 14.6 |
| average S [-] | 34.9 | 34.9 | 35.1 | 35.1 | 35.1 | 35.1 | 35.0 | 35.0 |
| average $a_{350}$ [$m^{-1}$] | 0.13 | 0.13 | 0.12 | 0.12 | 0.14 | 0.14 | 0.14 | 0.14 |
| abs. coef. n | 8.8 | 8.8 | 6.5 | 6.5 | 4.1 | 4.1 | 4.5 | 4.5 |
| Wind speed [m $s^{-1}$] | 8.1 | 8.1 | 8.6 | 8.6 | 6.7 | 6.7 | 8.8 | 8.8 |
| rel. hum. [%] | 100.0 | 100.0 | 77.8 | 77.8 | 80.9 | 80.9 | 88.0 | 88.0 |
| air pressure [hPa] | 1011.3 | 1011.3 | 1011.9 | 1011.9 | 1013.9 | 1013.9 | 1016.7 | 1016.7 |
| cloud coverage [-] | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |

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