Supplement of Third Revision of the Global Surface Seawater Dimethyl Sulfide 1 Climatology (DMS-Rev3)

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Figures

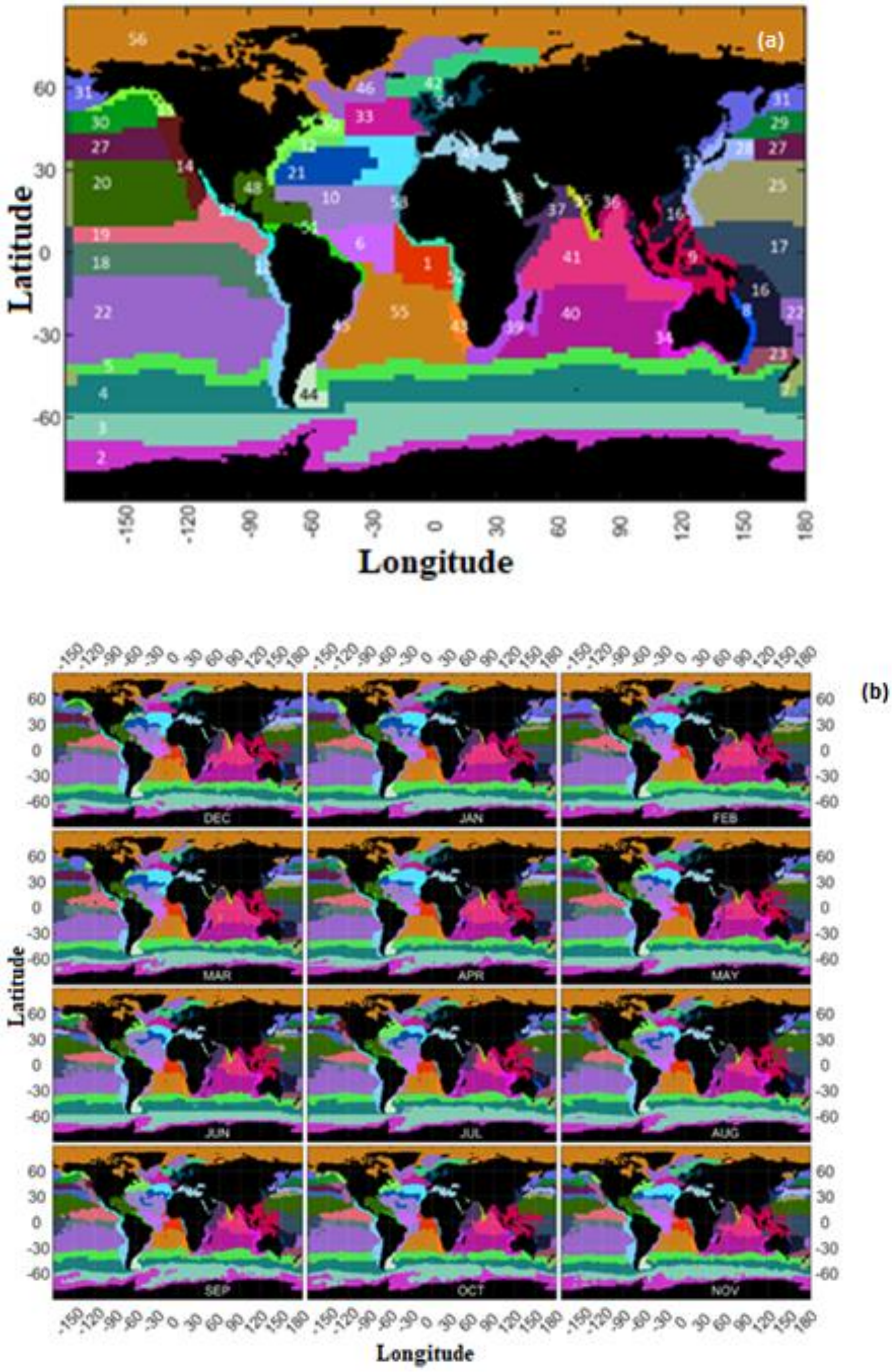


Figure S1: Static biogeochemical provinces (a) were used in the past for creating the DMS climatology and did not account for the monthly and seasonal variations in the biogeochemical properties of the ocean surface. The current estimate incorporated changing province boundaries (b) for sorting and processing the DMS data leading to a more realistic distribution. The numbers given in (a) represent the provinces as referred to in the DMS Rev3 code and manuscript. The names of the respective provinces are given in Table 1.

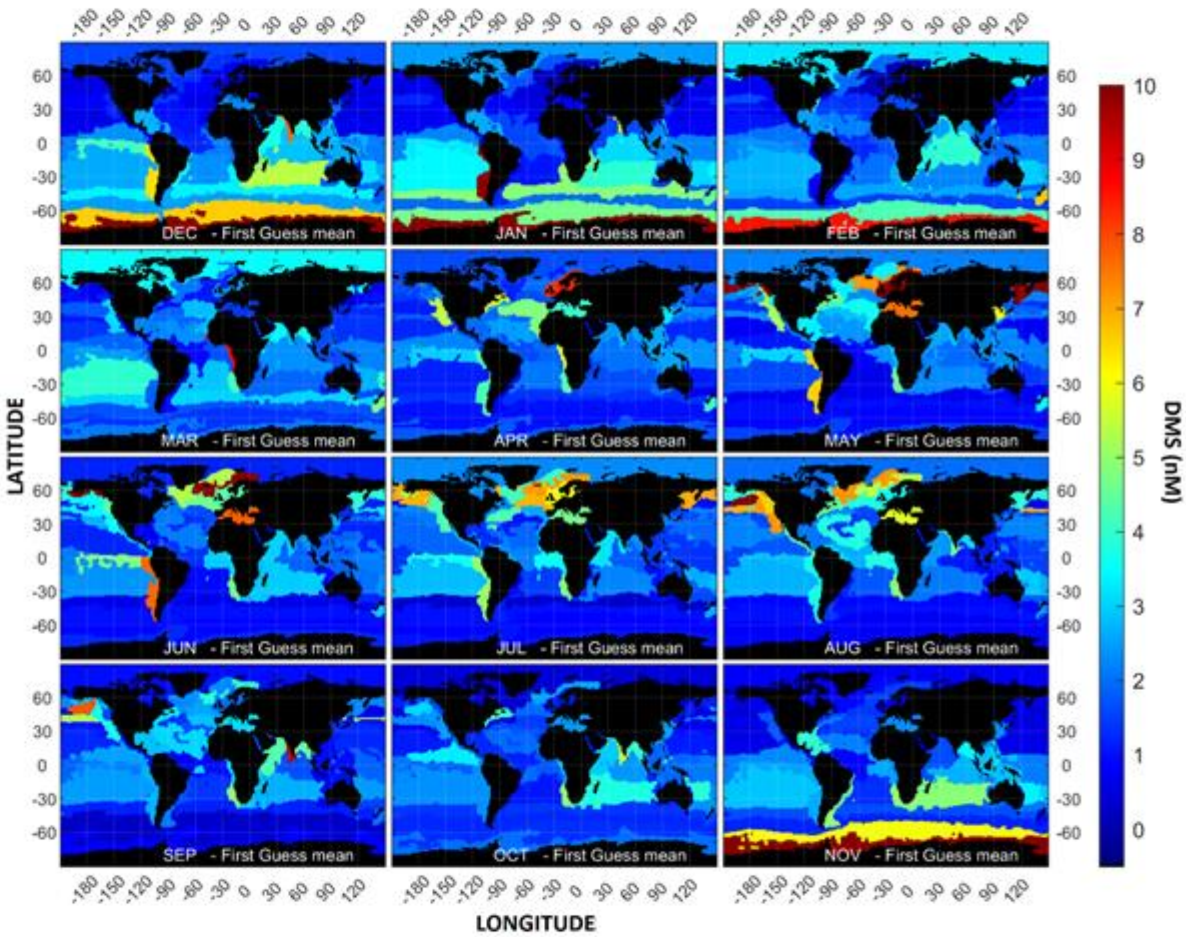


Figure S2: The unsmoothed 'first guess' DMS fields for all months using the dynamic biogeochemical province boundaries. This provided the first base for the seasonal changes in the regional as well as global DMS distribution.

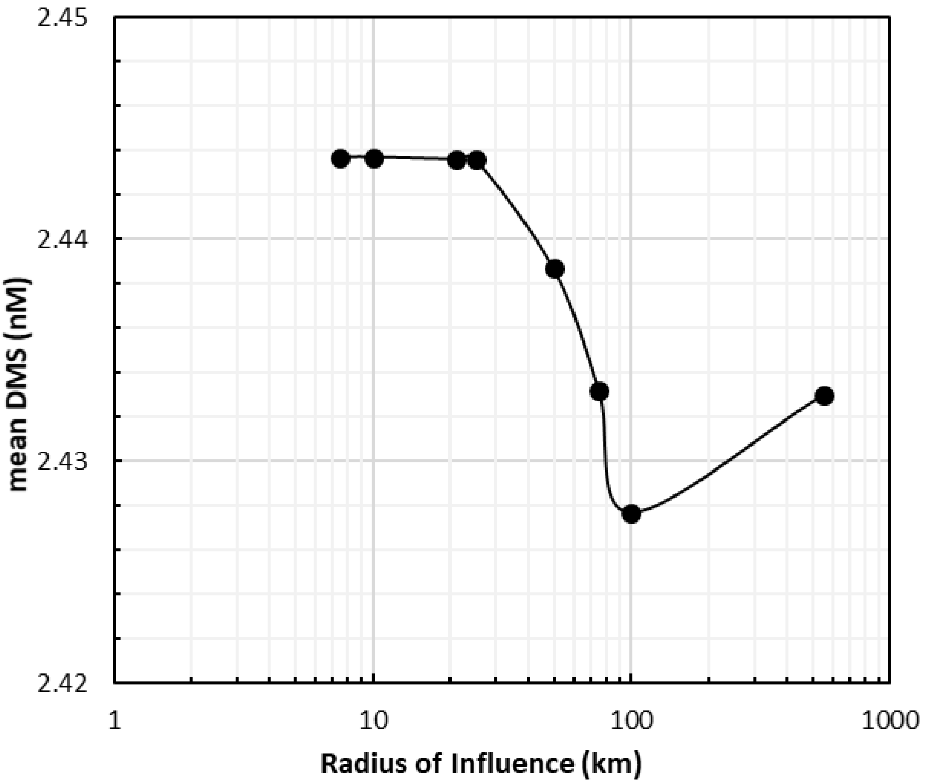


Figure S3: The global annual mean DMS values are obtained by varying ROI from 555 km to 7.5 km. The mean appears to stabilize above ~2.44 nM as the ROI reduces below 25 km.

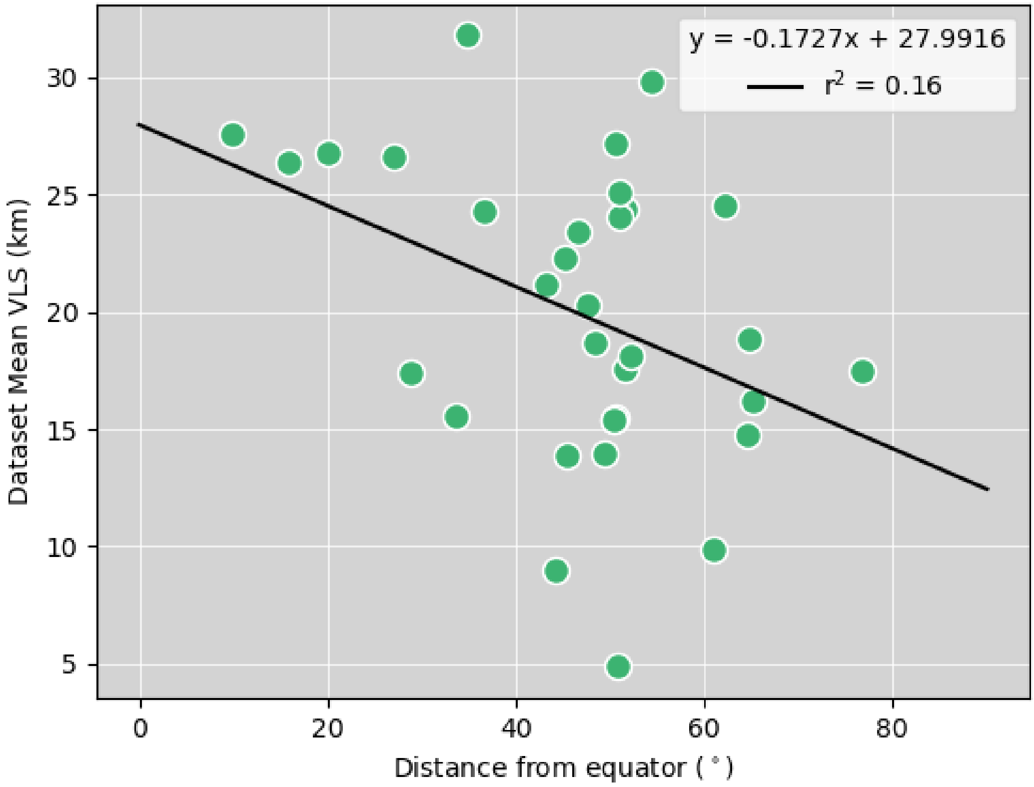


Figure S4: Global latitudinal pattern of DMS variability length scales (VLS). Mean VLS is calculated for each high-frequency measurement dataset, using cruise data from both hemispheres. (from Manville et al. in preparation)

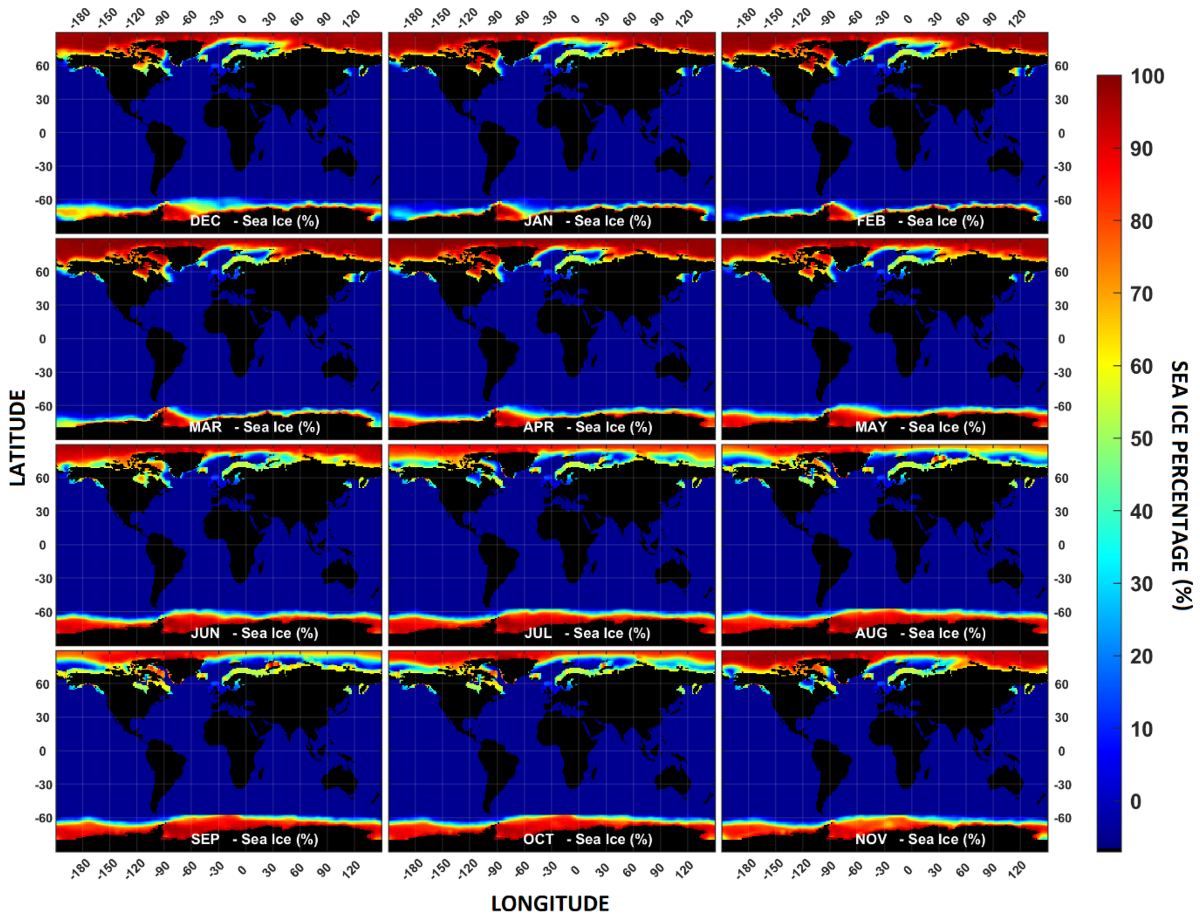
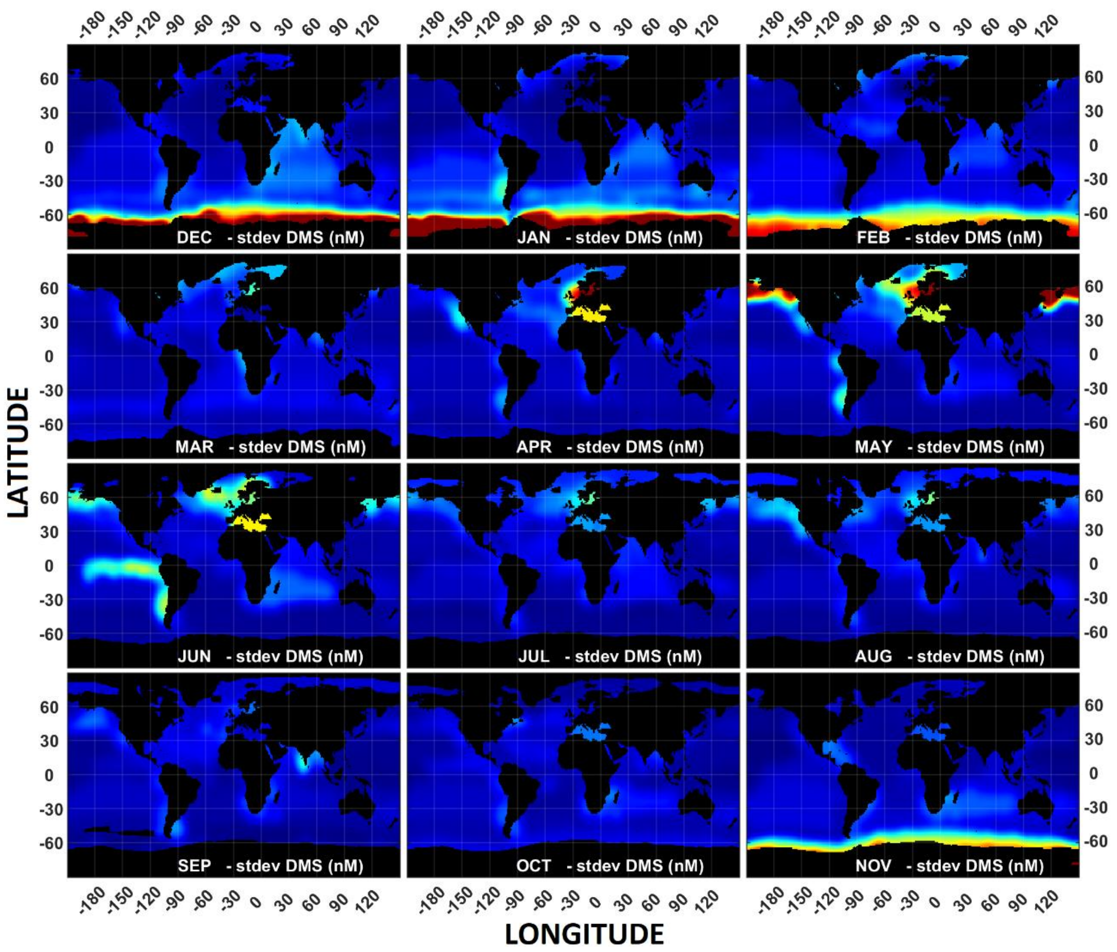


Figure S5: A sea-ice filter was used to filter out the data which possibly were under the sea-ice and hence not considered while calculating the global monthly, seasonal and annual climatology.



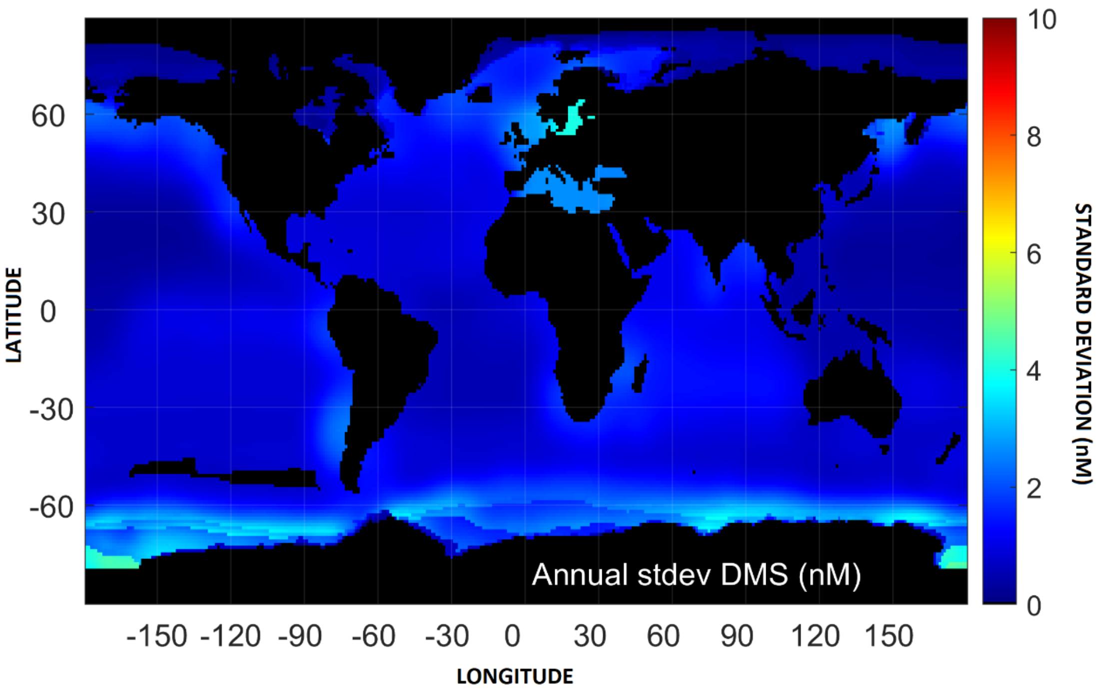
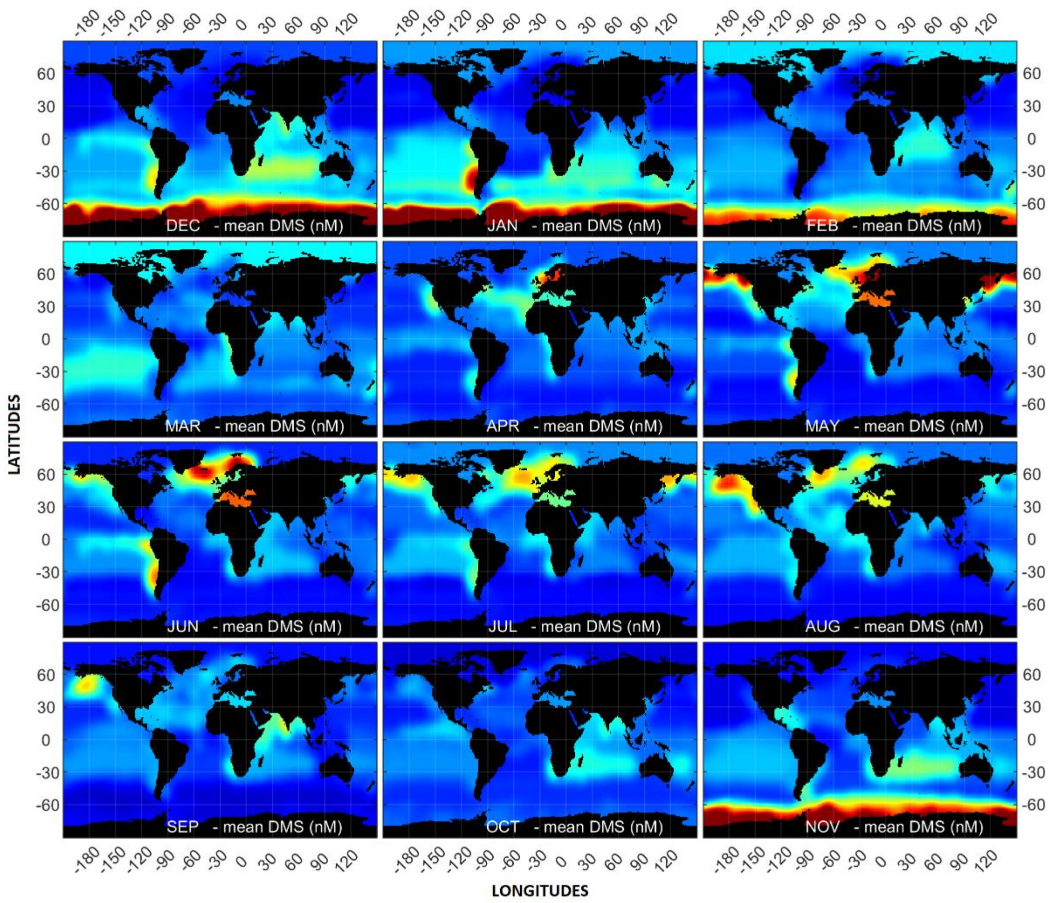


Figure S6: Distribution of the monthly and annual standard deviations for the DMS concentrations as estimated by the DMS-Rev3 climatology without the sea ice mask.



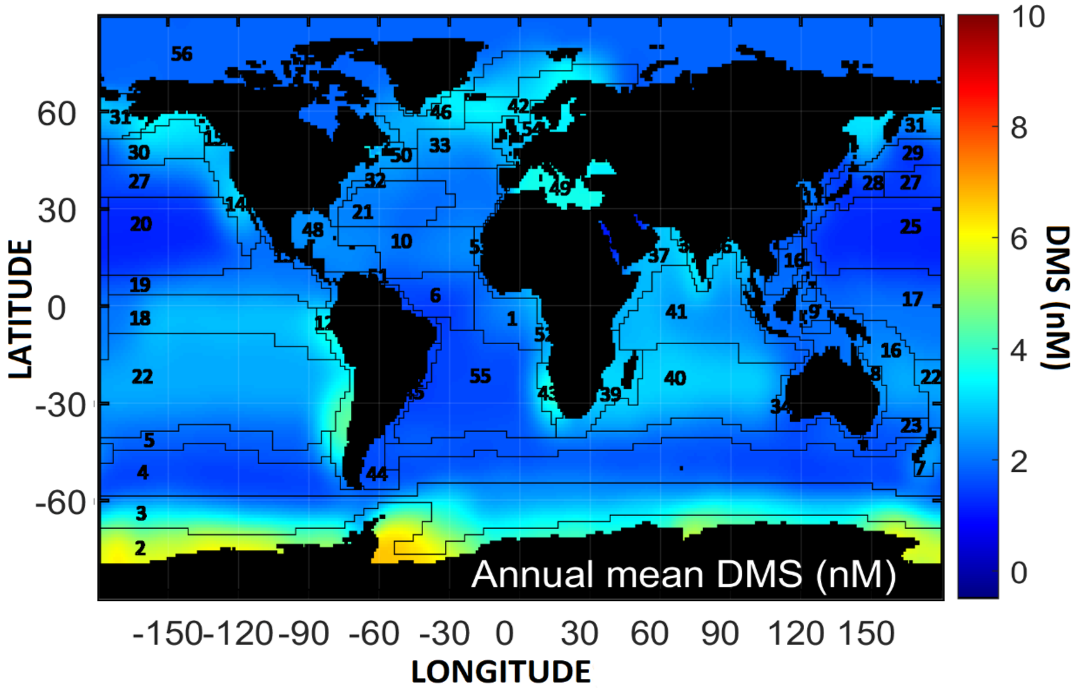


Figure S7: Distribution of the monthly and annual means for the DMS concentrations as estimated by the DMS-Rev3 climatology without the sea ice mask.

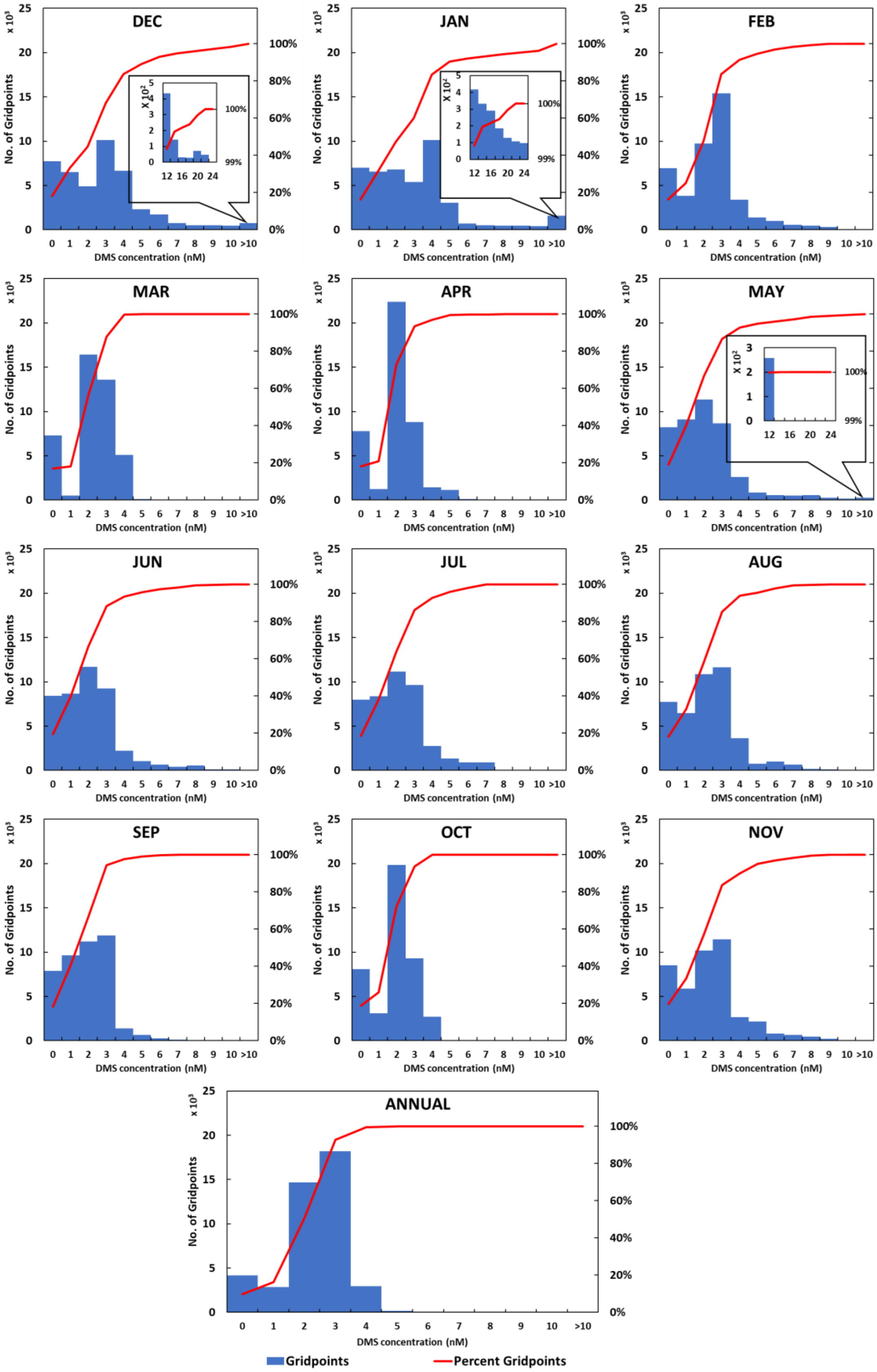


Figure S8: Grid-wise binned concentration distribution of DMS data for individual months and annually.

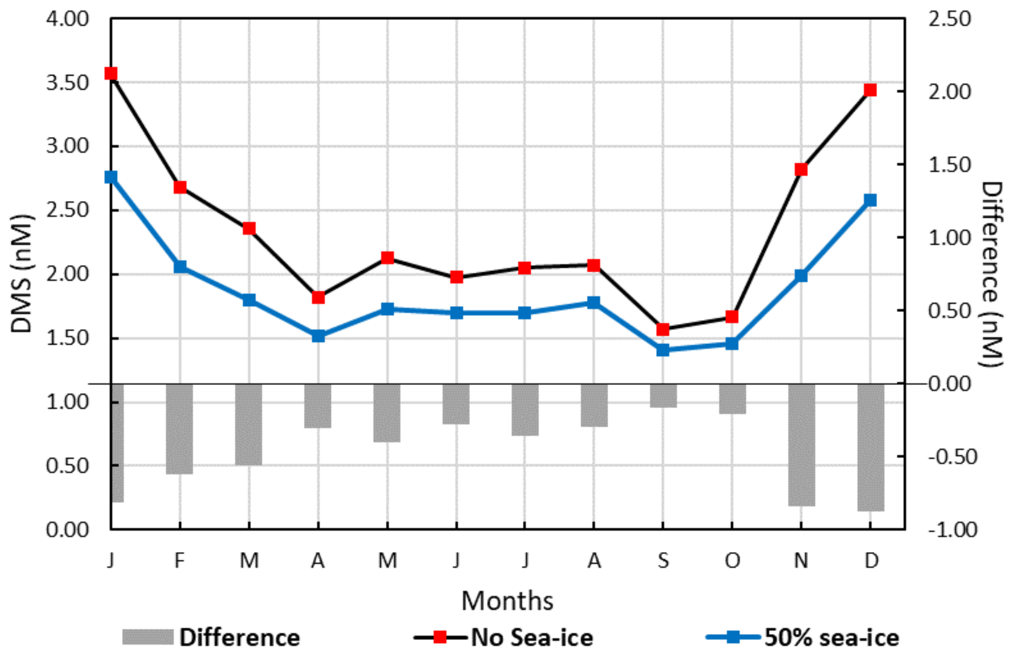


Figure S9: Monthly global mean DMS concentrations as estimated by DMS-Rev3 considering the effect of presence (blue line with blue markers) and absence (black line with red markers) of sea-ice cover with 50% threshold is shown. The difference (grey bars) that is observed between the two estimations shows the reduction in DMS concentration during southern summer due to sea ice while an increase is observed during the northern.

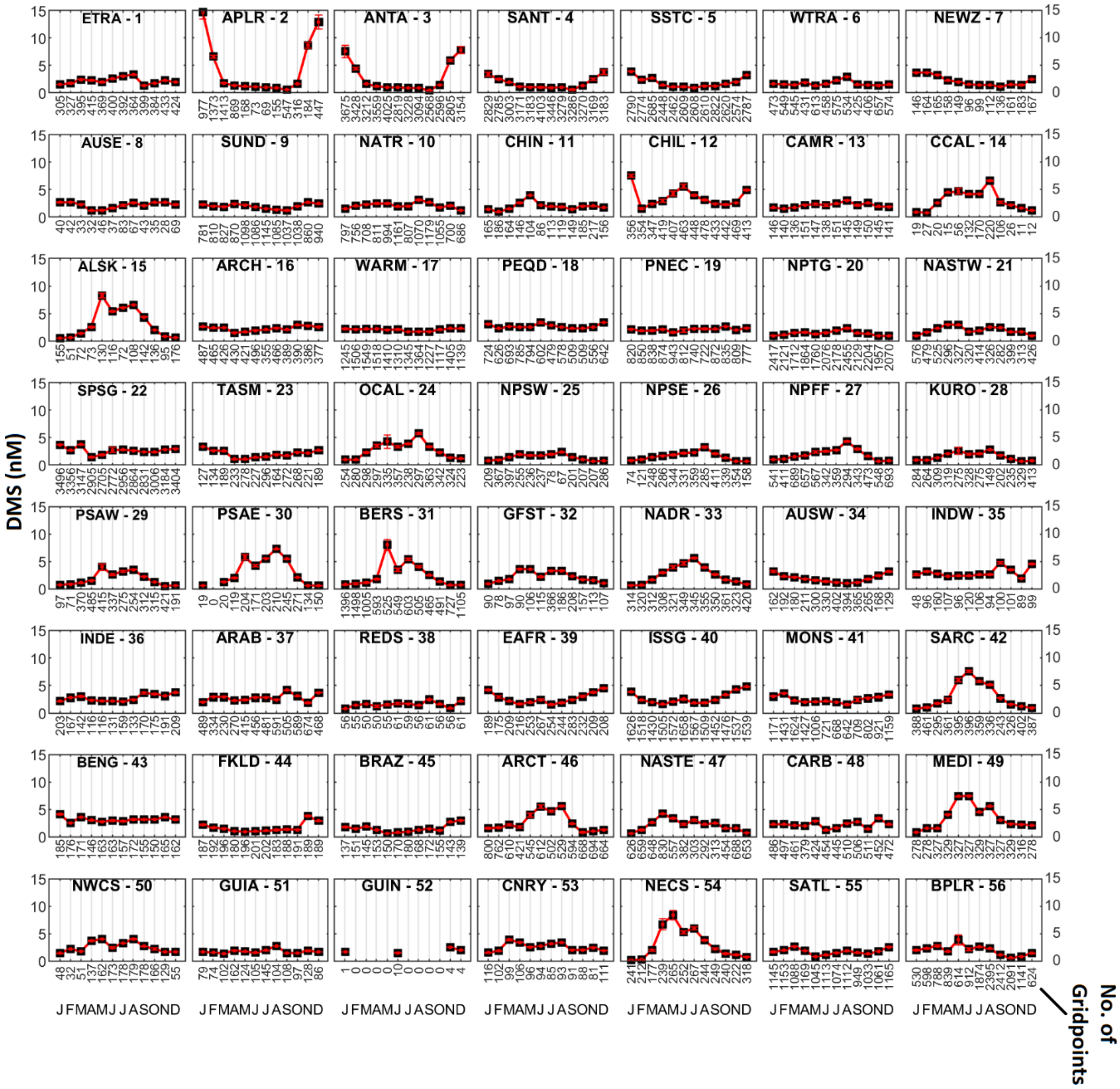


Figure S10: Final output of the DMS-Rev3 algorithm is shown in the figure. The GUIN province shows a lack of data besides January and August because it does not exist according to the dynamical province boundaries for those months.

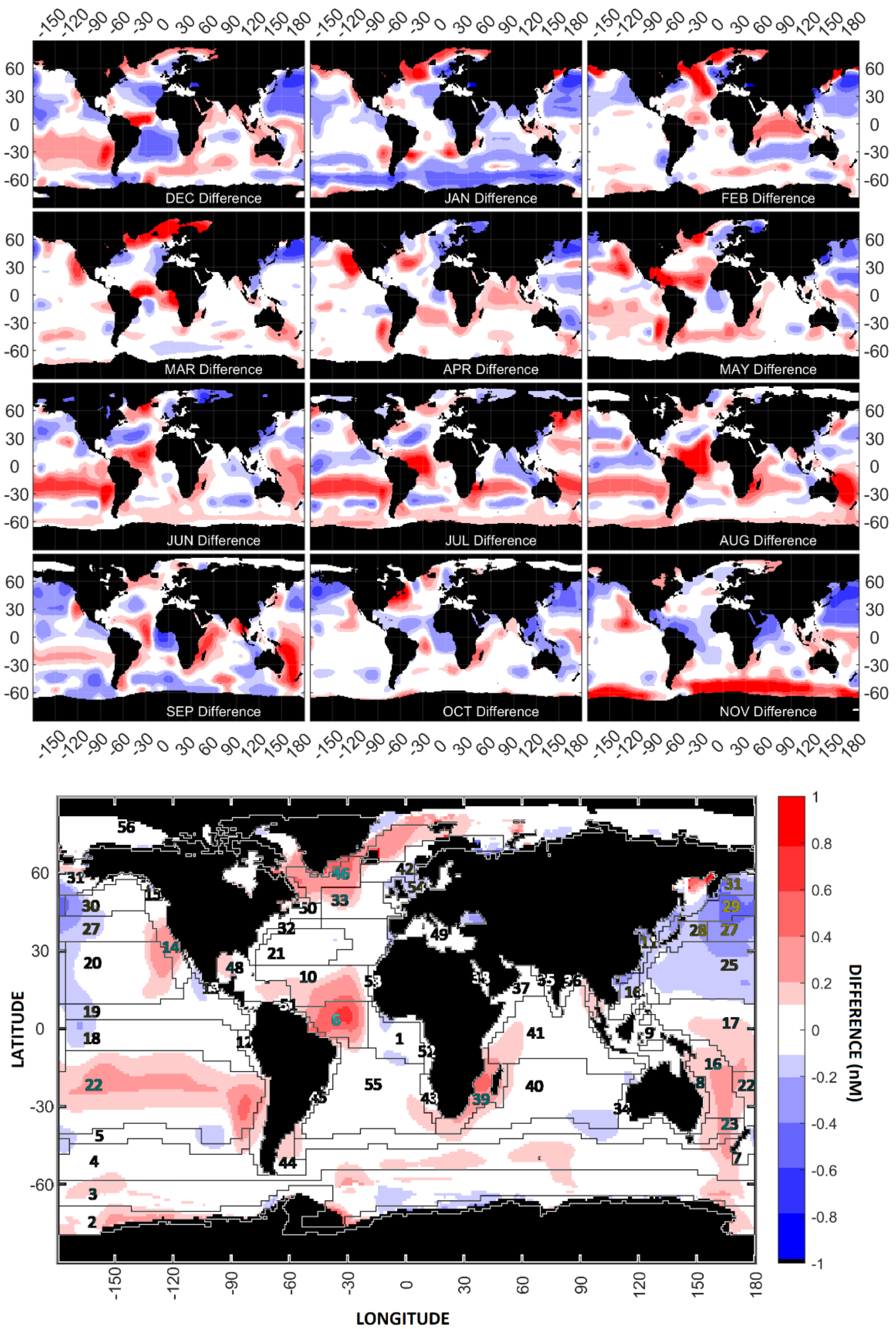
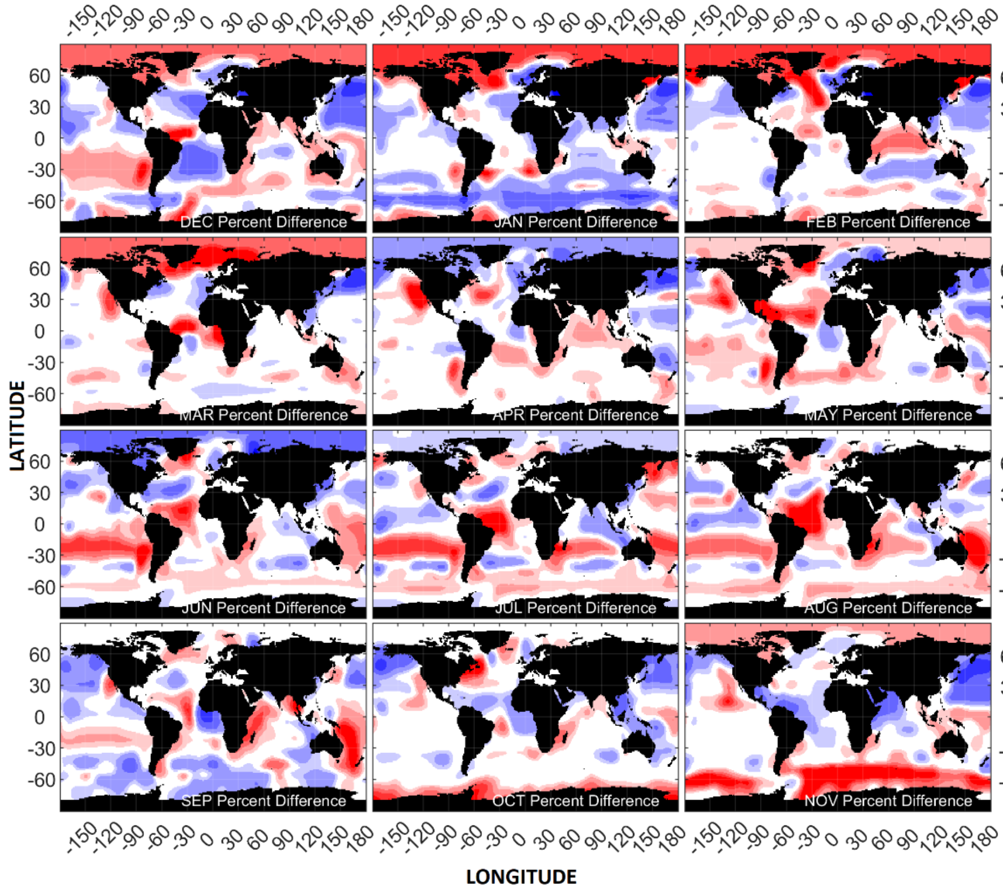


Figure S11a: Percentage difference between the monthly and annual mean DMS concentration estimated using dynamic and static biogeochemical province boundaries highlight the higher regional differences on a monthly scale and lower on an annual scale along the borders of the provinces.



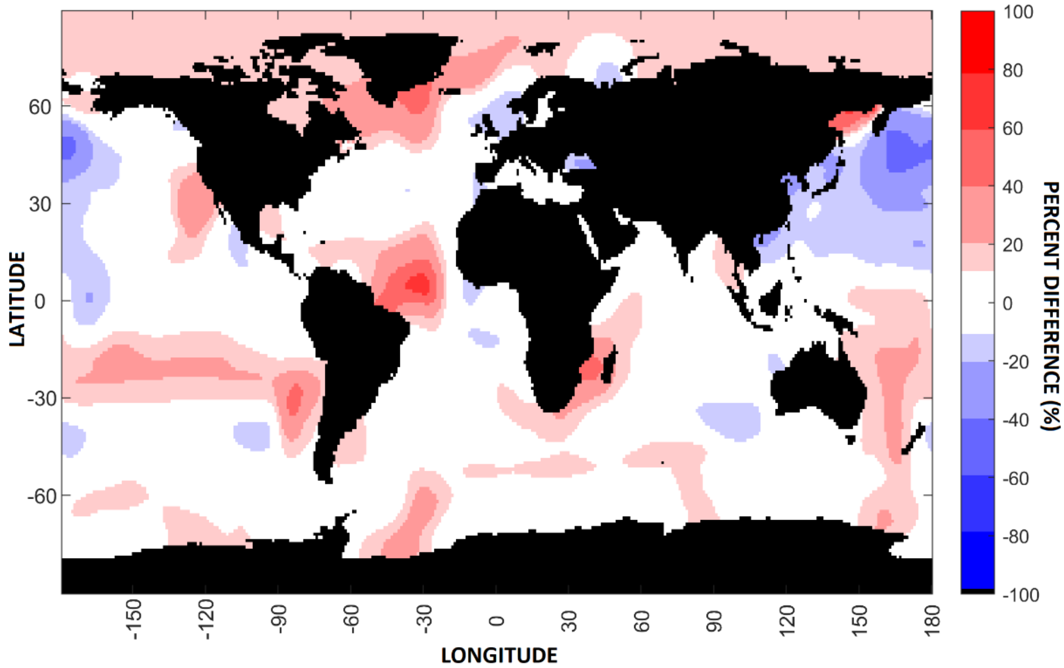
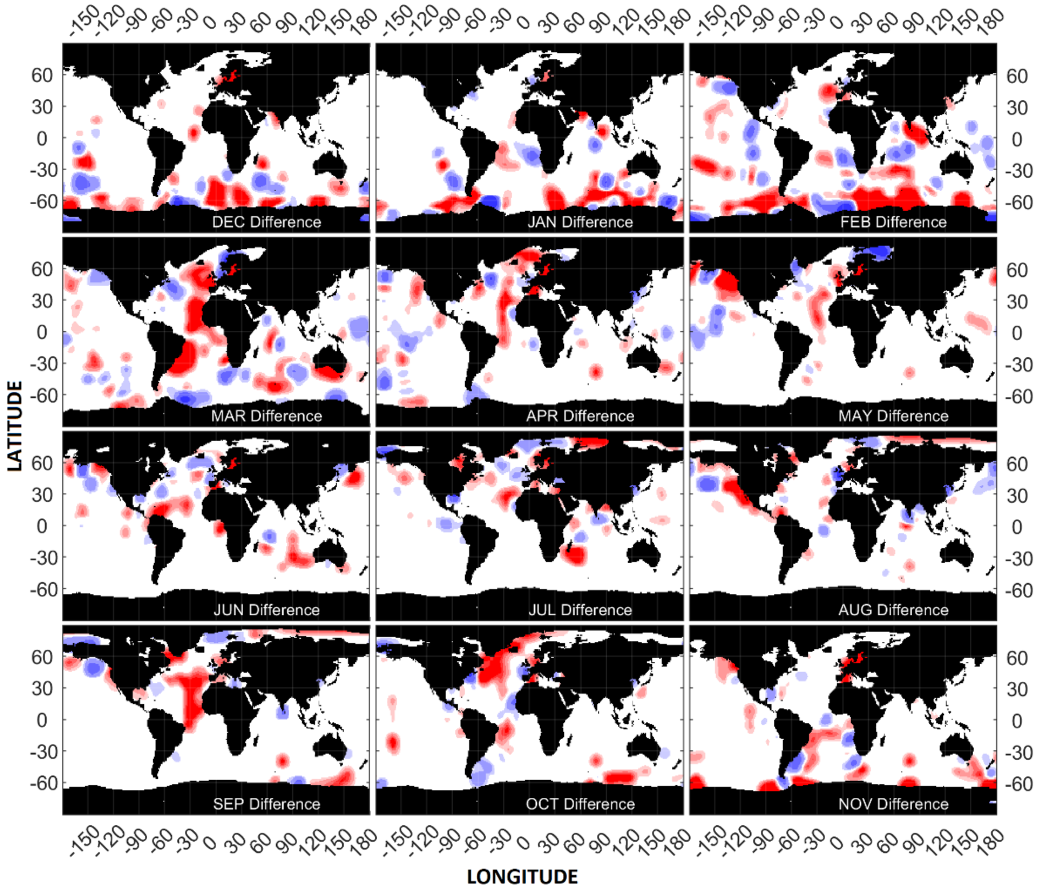


Figure S11b: Percentage difference between the monthly and annual mean DMS concentration estimated using dynamic and static biogeochemical province boundaries without considering sea ice cover.



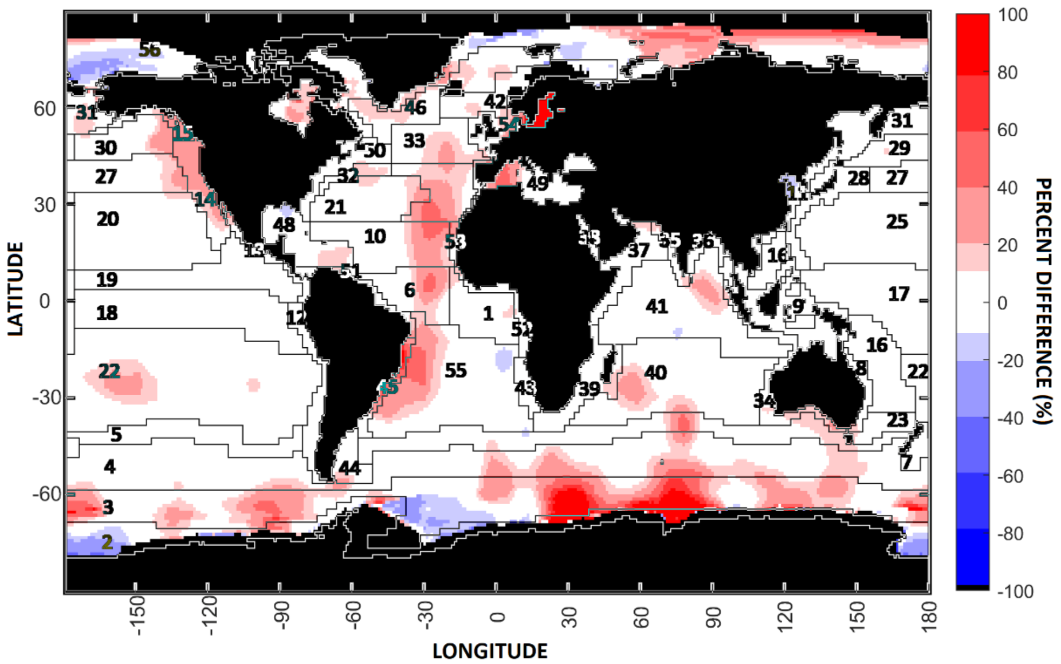


Figure S12: Percentage differences between using the Variability Length Scale (VLS) and a fixed value for Radius of Influence as used by L11 (555 km) shows that the usage of VLS leads to significant differences on a regional scale.

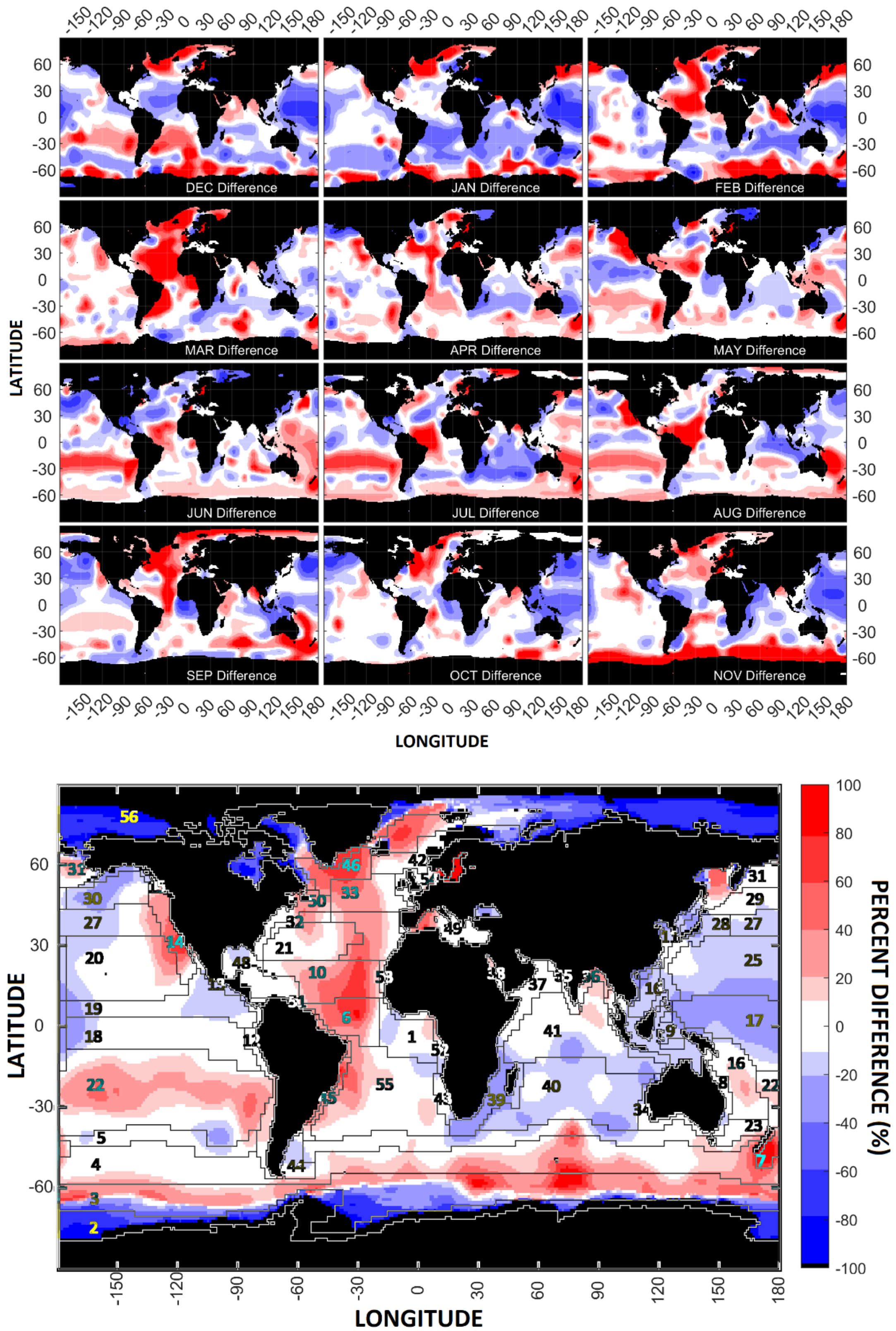


Figure S13: Percentage difference between the monthly and annual mean DMS estimated by Rev3 and L11 climatology mainly point towards the large differences observed in the polar regions in the monthly means.

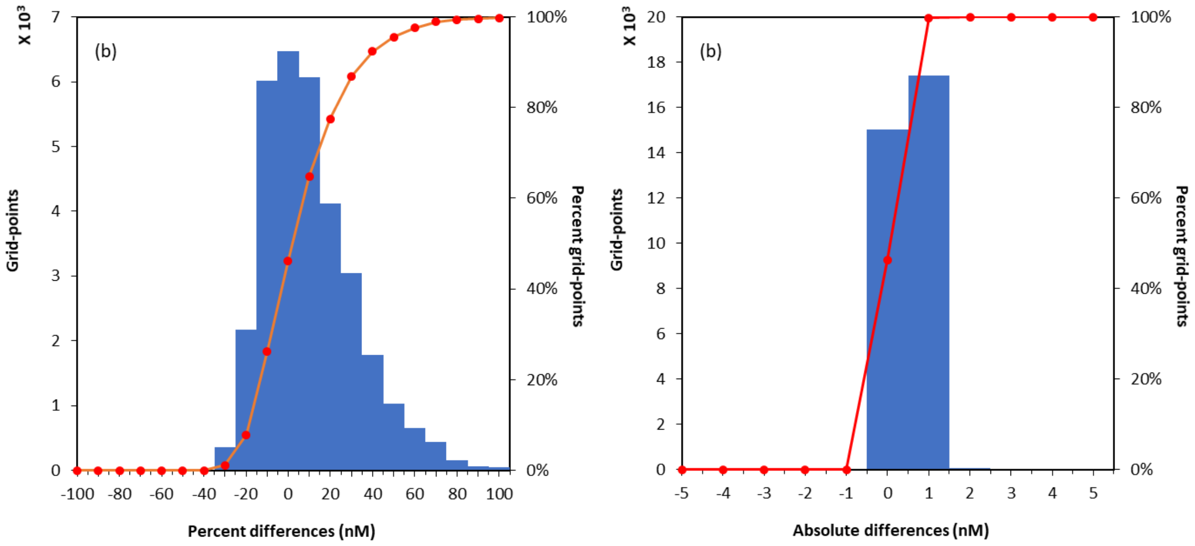
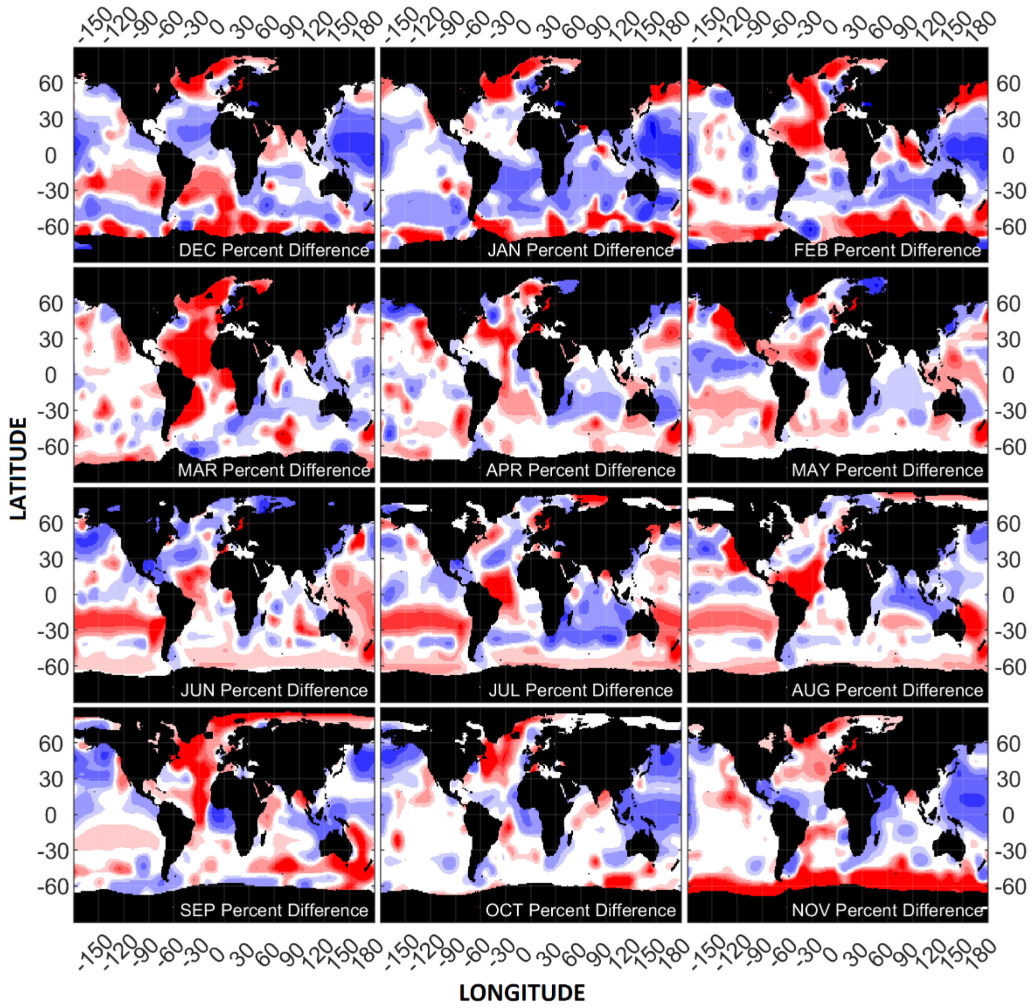


Figure S14: Grid-wise binned (a) percentage differences and (b) differences between DMS-Rev3 and L11



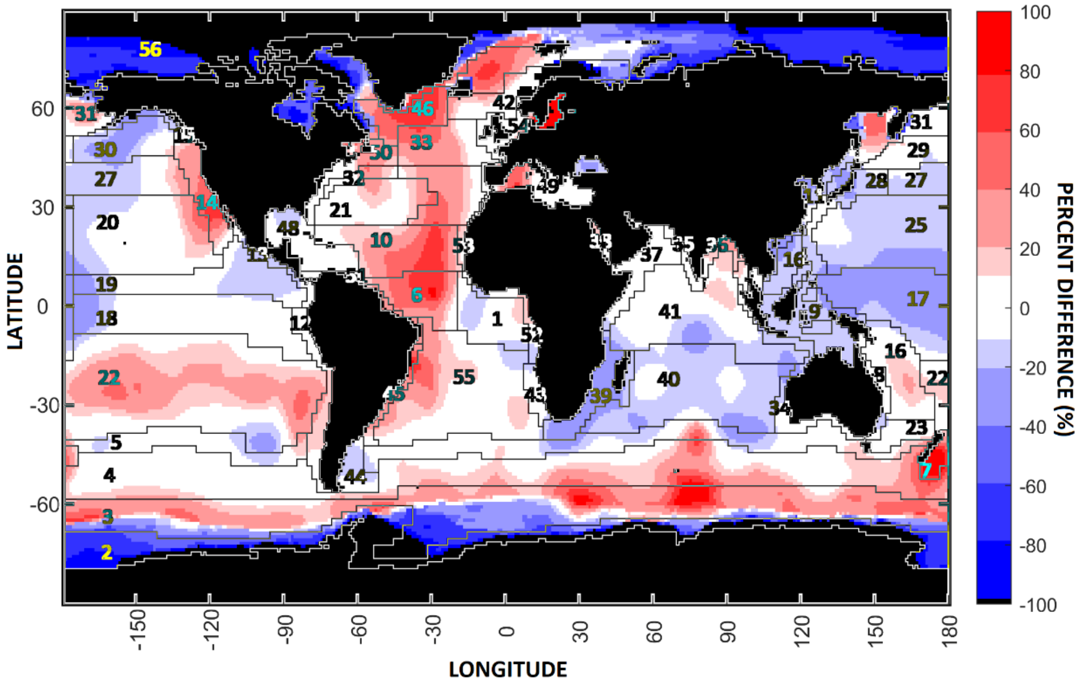


Figure S15: Percent difference between flux estimations of DMS-Rev3 and L11.

Table S1: Globally averaged differences between the DMS-Rev3 climatology and the L11 climatology, using 555 km as the ROI distance and between using the dynamic and static province boundaries for each month and annually.

Month	REV3-L11 (nM)	VLS-555 km (nM)	dynamic-static (nM)
January	0.04	-0.17	-0.50
February	-0.03	0.05	0.21
March	0.15	0.00	0.22
April	-0.21	0.03	-0.15
May	-0.22	-0.01	0.00
June	-0.22	0.01	-0.08
July	-0.08	0.09	0.07
August	-0.03	0.03	0.11
September	-0.03	0.00	-0.03
October	-0.17	0.02	-0.06
November	0.31	0.19	0.36
December	-0.05	0.05	0.06
Annual	**-0.05**	**0.02**	**0.02**