

Supplementary Material

Table S1. GEOS-Chem zonal percentage contributions to global sea-salt and marine POA emissions for January and July

| Parameterization | Percentage Contribution to Global Emissions (%) | | | | | |
|------------------|---|------|-------------|------|-------------|------|
| | 90°S - 31°S | | 31°S - 31°N | | 31°N - 90°N | |
| | Jan | July | Jan | July | Jan | July |
| G03 (sea-salt) | 23.6 | 6.9 | 47.1 | 51.3 | 29.3 | 41.8 |
| S08 | 17.0 | 40.2 | 44.6 | 44.7 | 38.4 | 15.1 |
| V10 | 26.0 | 11.2 | 40.5 | 51.1 | 33.5 | 37.8 |
| F10 | 27.6 | 15.9 | 34.9 | 51.0 | 37.4 | 33.1 |
| L11 | 22.7 | 8.3 | 45.6 | 54.2 | 31.6 | 37.6 |
| G11 | 17.9 | 13.6 | 52.5 | 61.8 | 29.6 | 24.6 |
| Eq. (3) | 17.0 | 29.1 | 48.9 | 60.4 | 34.1 | 10.5 |

Table S2. Comparison of 2009 hourly GEOS-Chem marine POA surface concentrations and submicron organic aerosol observations from Mace Head binned by the observed surface 10 meter wind speed

| Parameterization | 2009 Hourly Mace Head | | | | | |
|------------------|-------------------------------|-------------|---|-------------|--------------------------------|-------------|
| | $U_{10} < 6 \text{ m s}^{-1}$ | | $6 \text{ m s}^{-1} > U_{10} > 12 \text{ m s}^{-1}$ | | $U_{10} > 12 \text{ m s}^{-1}$ | |
| | NMB (%) | Correlation | NMB (%) | Correlation | NMB (%) | Correlation |
| S08 | 71.8 | 0.27 | 34.2 | 0.14 | -29.5 | 0.24 |
| V10 | -73.6 | 0.03 | -60.3 | 0.07 | -42.8 | 0.19 |
| F10 | -98.9 | 0.09 | -98.3 | 0.08 | -97.9 | 0.19 |
| L11 | -29.4 | -0.03 | 5.0 | 0.04 | 74.9 | 0.09 |
| G11 | -70.3 | 0.08 | -59.9 | 0.12 | -59.8 | 0.28 |
| Eq. (3) | 50.6 | 0.12 | 84.4 | 0.16 | 40.9 | 0.33 |

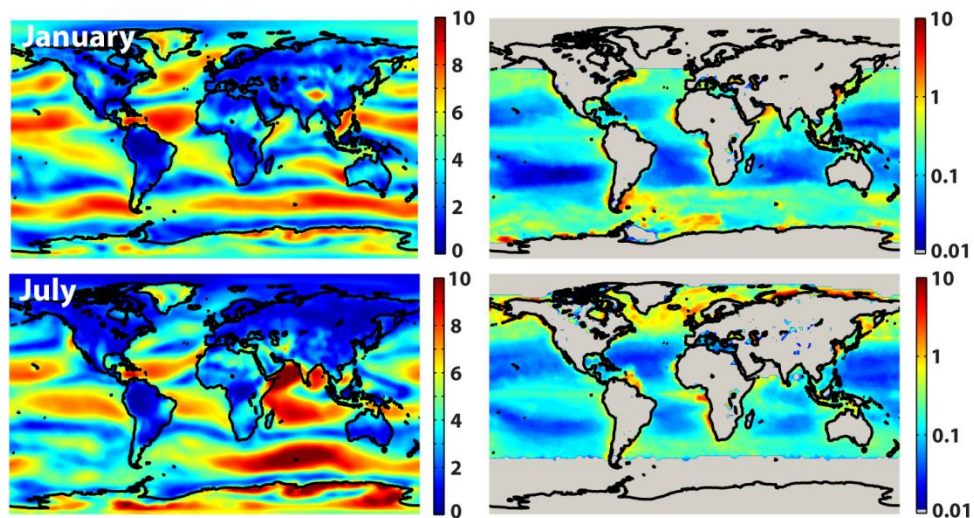


Fig. S1. Multi-year (2006 and 2009) average January (top row) and July (bottom row) U_{10} (right column in units of m s^{-1}) and [chl *a*] (left column in units of mg m^{-3}) values used in GEOS-Chem.