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# Characterization of Remote Organic Aerosols across the whole Troposphere: using ATom measurements and global chemistry modeling

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Submicron organic aerosols (OA) are among major sources of uncertainty in our understanding of human effects on climate. This study presents an extensive characterization of the OA mass concentrations and their level of oxidation in the remote troposphere where measurements have been very limited. The OA vertical distribution was measured onboard the NASA's Atmospheric Tomography (ATom) pole-to-pole airborne summer (August 2016) and winter (February 2017) campaigns. Measurements show strong seasonal and zonal variability with the highest concentrations in the summer, and over the equatorial regions (up to 1 ug sm-3), decreasing to ∼0.1-0.3 ug sm-3 in the northern mid- and high- latitudes and to below 0.1 ug sm-3 in the southern mid- and high- latitudes. The OA dataset is used to evaluate predictions of seven global chemistry climate models in the remote marine atmosphere where constraints from observations have been of a limited spatial extent, and where model uncertainties are the largest with a factor of 40-400 spread in the OA predictions from the AeroCom-II models. The model ensemble captures reasonably well the average vertical and spatial distribution of OA concentrations, and the dispersion of the individual models stays within a factor of 5. Although the results are improved over the AeroCom-II study, some of the agreement with observations is for the wrong reasons, which will be discussed during the presentation. In particular the focus will be put on analyzing the contribution and properties of secondary organic aerosols.