2.037 An Evaluation of Global Organic Aerosol Simulations of Varying Complexity using Airborne Observations.

Early Career Scientist

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Abstract:

Chemical transport models have historically struggled to accurately simulate the magnitude and variability of organic aerosol (OA), with previous studies demonstrating that models significantly underestimate observed concentrations in the troposphere. In this study we explore different model OA schemes using the GEOS-Chem chemical transport model and compare the simulations to a suite of globally-distributed airborne observations from 2008-2017. These include the recent Korus-AQ and ATom campaigns and provide broad coverage over a diverse set of regimes – anthropogenic, biogenic, fire and remote. The evaluated model schemes span a range of formation mechanisms – including a simple fixed-yield parameterization, a volatility basis set, and an explicit treatment of IEPOX aqueous uptake. We also use the observations to optimize the fixed-yield approach for the various precursor types. The result of this analysis is an improved parameterized OA scheme that significantly reduces bias and improves model skill when compared to ambient observations while maintaining the computational advantage of a parameterized approach.