



Quantification of A Tropical Missing Source From Ocean For The Carbonyl Sulfide Global Budget

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Quantifying the carbonyl sulfide (OCS) surface fluxes contributes to the understanding of both sulfur cycle and carbon cycle. Although the major sources and sinks of OCS are well recognized, the uncertainties of individual types of the fluxes remain large. With the understanding of a large underestimate of ecosystem uptake, it suggests a large missing ocean source over tropical region to compensate the increased sink. However before AURA Tropospheric Emissions Spectrometer (TES) OCS data is released, no direct measurements have been taken to test this hypothesis. In this study, we performed a flux inversion to update the fluxes from TES OCS. Then we compared three experimental GEOS-Chem forward model runs driven by different fluxes based on TES inversion to HIPPO aircraft estimates in free troposphere and also to NOAA near surface observations. The TES data supports the hypothesis that a large source from tropical ocean is missing in the current OCS global budget and suggests that the source is even larger than that proposed in Berry et al., (2013). Consequently, it leads to a larger land uptake and increase the estimates of GPP. TES data also suggests the missing oceanic source is not symmetric about equator. It is strong and distributed further north of the equator (to 40°N) but weak and narrow south of the equator (to 20°S).