

6.216 Tropical sources and sinks of carbonyl sulfide observed from space.

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Abstract:

Regional and global analysis of atmospheric carbonyl sulfide (COS) can provide a novel constraint on the carbon cycle (Campbell et al., Science 2008). However, observations of COS are sparse in tropical regions. Here we use the comprehensive data set of spaceborne measurements of the Michelson Interferometer for Passive Atmospheric Sounding to analyze its global distribution (Glatthor et al., GRL, 2015). Two major features are observed in the tropical upper troposphere around 250 hPa: enhanced amounts over the western Pacific and the Maritime Continent, peaking around 550 parts per trillion by volume (pptv) in boreal summer, and a seasonally varying depletion of COS extending from tropical South America to Africa. The large-scale COS depletion, which in austral summer amounts up to -40 pptv as compared to the rest of the respective latitude band, has not been observed before and reveals the seasonality of COS uptake through tropical vegetation. The observations can only be reproduced by global models, when a large vegetation uptake and a corresponding increase in oceanic emissions as proposed in several recent publications are assumed.