



Observation and modeling of short-lived oxygenated hydrocarbons in the tropical free troposphere

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The Tropical Ocean tRoposphere Exchange experiment TORERO (Jan/Feb 2012) probed the influence of air-sea exchange of organic carbon species and very short lived halogen species on the oxidative capacity of the tropical free troposphere over the full tropospheric air column above the eastern tropical Pacific Ocean. Organic carbon is important in the atmosphere, because it influences the reactive chemistry and lifetime of climate active gases (e.g., methane, ozone, dimethyl sulfide), and because of its relevance for the formation, composition and climate impact of aerosols. This presentation summarizes unequivocal evidence for the presence of numerous oxygenated hydrocarbons (i.e. glyoxal, formaldehyde, acetaldehyde, propanal, MVK, MEK, aliphatic aldehydes, alcohols etc.) in the remote marine boundary layer, and in the tropical free troposphere. These species were detected by means of both Differential Optical Absorption Spectroscopy (Airborne MAX-DOAS), and online GC-MS (TOGA) aboard the NSF/NCAR GV aircraft. We employ atmospheric modeling constrained by observations of gas-phase hydrocarbons, aerosols, photolysis frequencies, and meteorological parameters measured aboard the plane to elucidate the formation mechanism of this as of yet unaccounted source for oxidized organic carbon, and quantify the influence on the OVOCs on hydroxyl, bromine and chlorine radical abundances.