

A Tropical Tropospheric Source of High Ozone/Low Water Filaments in the Western Pacific

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Numerous field campaigns have noted the prevalence of filaments of high O₃ and low H₂O (HOLW) in the tropical western Pacific (TWP) troposphere. These filaments can drastically alter the chemistry, meteorology, and climate of the region through alteration of the OH budget, suppression of convection, and changes in local radiative forcing. These filaments are often cited as having a dynamical origin, caused by transport from the mid-latitude upper troposphere (mlUT) or stratosphere. Studies attributing the high O₃ to tropical tropospheric processes, namely biomass burning, frequently do not explain the low H₂O. We will show that these filaments were a dominant feature observed during the CONTRAST and CAST campaigns, conducted in the TWP during January and February 2014. Back trajectory analysis connects the observed HOLW filaments to regions of active biomass burning in the tropics. The chemical composition of the filaments confirms this biomass burning origin and suggests that mlUT and stratospheric influence is negligible. We will also show that the low H₂O observed in these filaments is consistent with large-scale subsidence in the tropics.