

OH in the TWP: An In-Depth Comparison of CONTRAST and CAM-Chem OH Precursors and Implications for the Oxidative Capacity of the Troposphere

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Hydroxyl radical (OH) is the main daytime oxidant in the troposphere and determines the atmospheric lifetimes of many compounds of interest. It has been hypothesized that a region of very low OH in the tropical western Pacific Ocean allows otherwise short-lived compounds (including biogenic ozone depleting substances) to be transported intact to the UTLS by deep convection. We use the complete, updated measurements from the CONTRAST field campaign in the tropical western Pacific to constrain the box model DSMACC and estimate OH concentrations encountered in the mid- to upper-troposphere of this region. Measurements reveal a background, unpolluted state of the troposphere, with pervasive high O₃/low H₂O filamentary structures present in the mid-troposphere. We examine the impacts of these distinct air parcels on OH as well as the global model CAM-Chem's ability to reproduce these conditions. The effects of OH precursor differences between observations and CAM-Chem on the oxidative capacity of the troposphere are further investigated using the box model.