Bi-modal Distribution of Tropical Tropospheric Ozone over the Western Pacific from CONTRAST Observations

Laura L. Pan[1], Shawn B. Honomichl[1], William J. Randel[1], Eric C. Apel[1], Elliot L. Atlas[2], James F. Bresch[1], Rebecca Hornbrook[1], Douglas E. Kinnison[1], Jean-Francois Lamarque[1], Alfonso Saiz-Lopez[3], Ross J. Salawitch[4], and Andrew J. Weinheimer[1]

[1]*National Center for Atmospheric Research, Boulder, Colorado, USA*
[2]*Dept. of Atmospheric Sciences, RSMAS, University of Miami, Miami, Florida, USA*
[3]*Atmospheric Chemistry and Climate Group, Institute of Physical Chemistry Rocasolano, CSIC, Madrid, Spain*
[4]*Department of Atmospheric and Oceanic Science, Department of Chemistry and Biochemistry, and Earth System Science Interdisciplinary Center, University of Maryland, College Park, Maryland, USA*

Observations during the recent airborne field campaign CONTRAST revealed a bi-modal distribution of free tropospheric ozone over the remote western Pacific. A primary mode, narrowly distributed around 20 ppbv, dominates the free troposphere from the surface to 15 km in altitude (~360 K potential temperature level). A secondary mode, broadly distributed with a 60 ppbv modal value, is prominent between 315 K to 345 K potential temperature levels. These findings provide new insight on the physical interpretation of the mean ozone profiles in the tropics, including the identification of the TTL. In this paper, we present the observations, analyses and modeling, using both NCAR global model CAM-Chem and trajectory models, to characterize the bi-modal behavior of ozone and the controlling mechanisms.