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A Comparison of Ticosonde-SHADOZ Ozone Profiles to Large-Scale Analyses and Satellite Data

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Accurate representation of both the mean structure and variability of atmospheric constituents in the neighborhood of the tropical tropopause where strong vertical gradients are the rule remains a continuing challenge despite advances in satellite profiling and large-scale model reanalysis. In the tropics in particular there are relatively few long-term in situ measurements to assess these comprehensive datasets. Here we take advantage of the more than 11 years of Ticosonde-SHADOZ ozone profiles at San José, Costa Rica located at 10°N, 84°W where we investigate the representation of upper tropospheric and lower stratospheric ozone (UT/LS) in large-scale datasets including Aura MLS v4.2, the MERRA 2 reanalysis and a hindcast simulation with NASA GMI chemical transport model. We examine the long-term as well as seasonal variability of observed and simulated ozone profiles over Costa Rica in order to identify the physical process governing the vertical structure of ozone in the UT/LS. We also use these results as to gain insight into the factors leading to altitude-dependent differences among the datasets.