

Geophysical Research Letters

Supporting Information for

**The Role of Convection in Tropical Ozone Trends (1998-2018)
Based on SHADOZ Profiles**

**Anne M. Thompson^{1*}, Ryan M. Stauffer^{1,2}, Jacquelyn C. Witte³, Debra E.
Kollonige^{1,4}, Krzysztof Wargan^{1,4}, Jerry R. Ziemke^{1,5}**

¹ NASA/Goddard Space Flight Center (GSFC), Greenbelt, MD, USA

²Earth System Science Interdisciplinary Center, University of Maryland, College Park,
MD, USA

³National Center for Atmospheric Research Earth Observations Laboratory, Boulder, CO,
USA

⁴Science Systems and Applications, Inc., Lanham, MD, USA

⁵Morgan State University, Baltimore, Maryland, USA

*Corresponding author: Anne M. Thompson (anne.m.thompson@nasa.gov)

Contents of this file

Figures S1 to S6

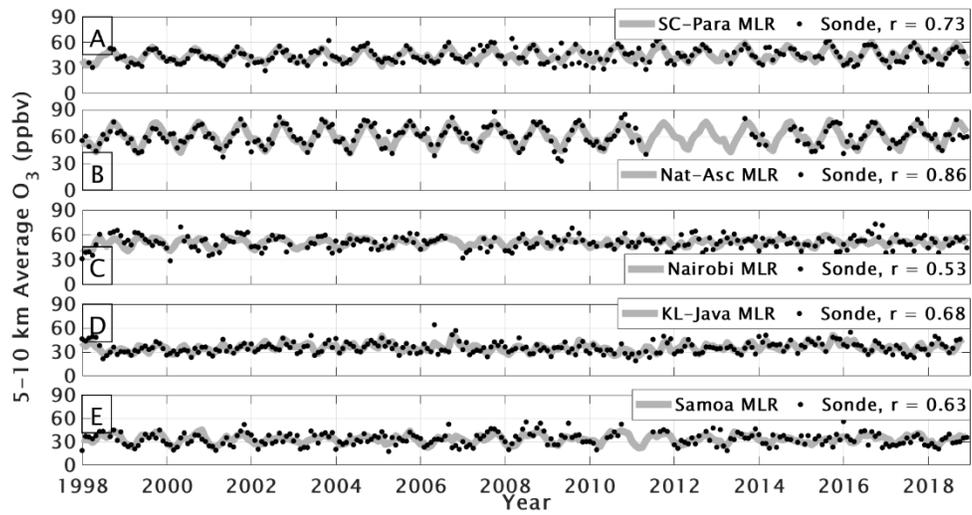


Figure S1. Monthly averaged MLR (grey lines) and ozonesonde (black dots) ozone (O_3) mixing ratios for the two individual and three combination sites in the 5 to 10 km layer. Correlations between MLR and ozonesonde data are shown in each legend.

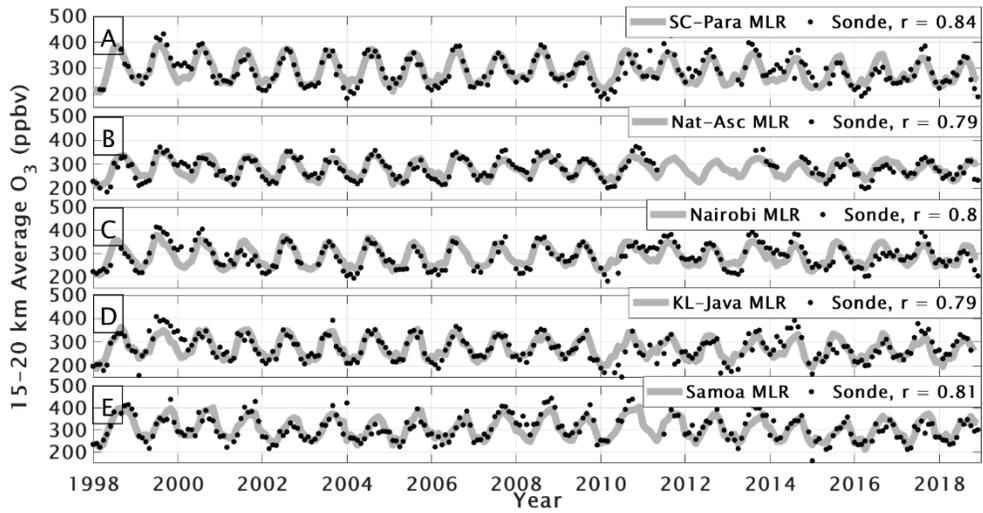


Figure S2. Monthly averaged MLR (grey lines) and ozonesonde (black dots) ozone (O₃) mixing ratios for the two individual and three combination sites in the 15 to 20 km (LMS) layer. Correlations between MLR and ozonesonde data are shown in each legend.

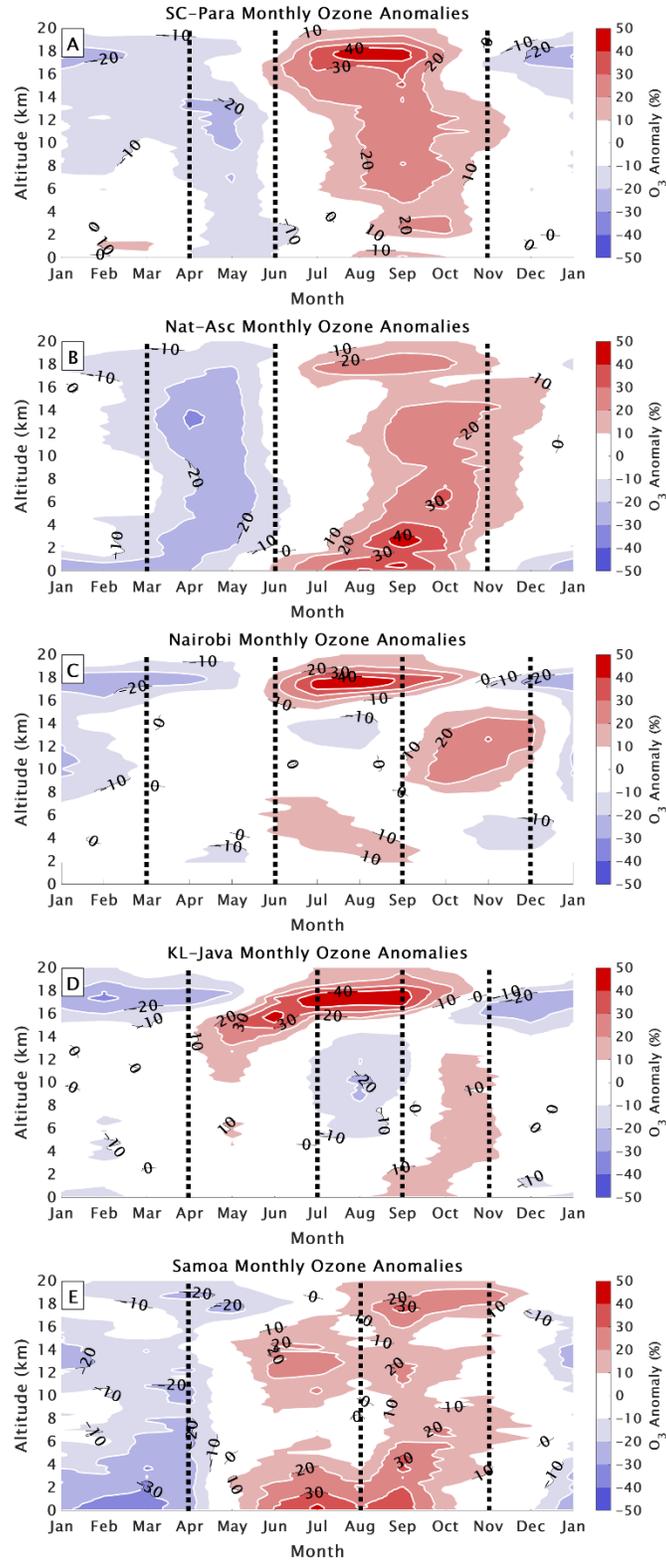


Figure S3. Monthly averaged ozone (O_3) mixing ratio anomalies in percent from the surface to 20 km altitude for the two individual and three combination sites. Black dashed lines (same as the white dashed lines in Figure 2) indicate transition periods marked by large changes to the climatological FT and LMS O_3 amounts.

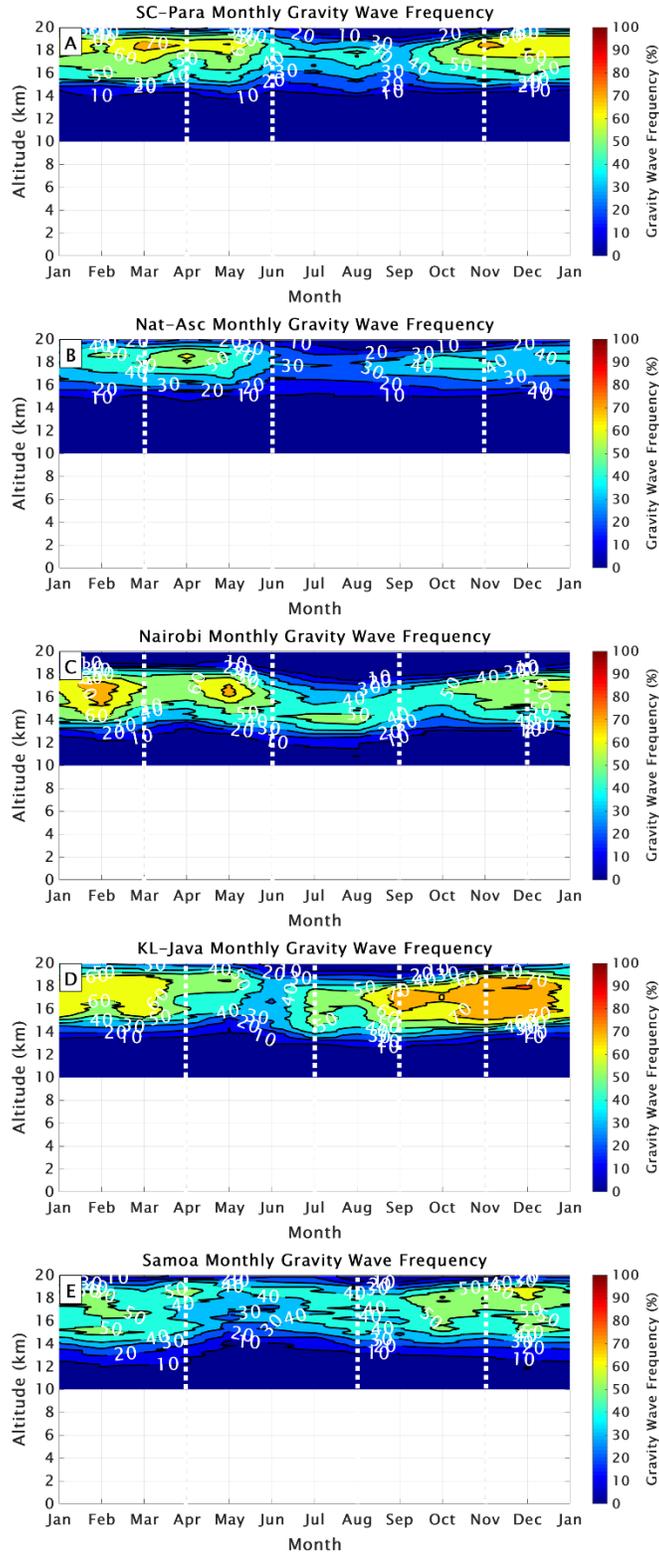


Figure S4. Monthly averaged gravity wave frequency (GWF) in percent from 10 to 20 km altitude corresponding to the profiles in Figure 2 for the two individual and three combination sites. White dashed lines are set by the ozone (O_3) mixing ratio gradients as shown in Figures 2 and S3.

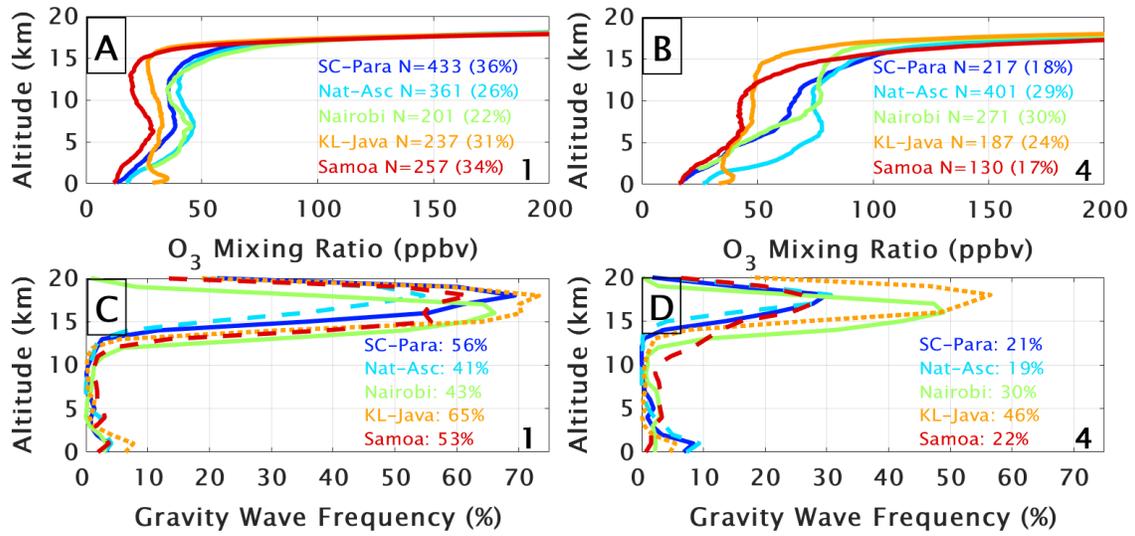


Figure S5. (a, b): SOM cluster ozone means for the two individual and three combination sites. The number and percentage of profiles contributing to each of four clusters (two not shown) appear in each frame. (c, d): Gravity wave frequency (GWF in text) as a function of altitude corresponding to SOM clusters 1 and 4. Average GWF from 15 to 20 km (LMS) for each site is shown in the frames.

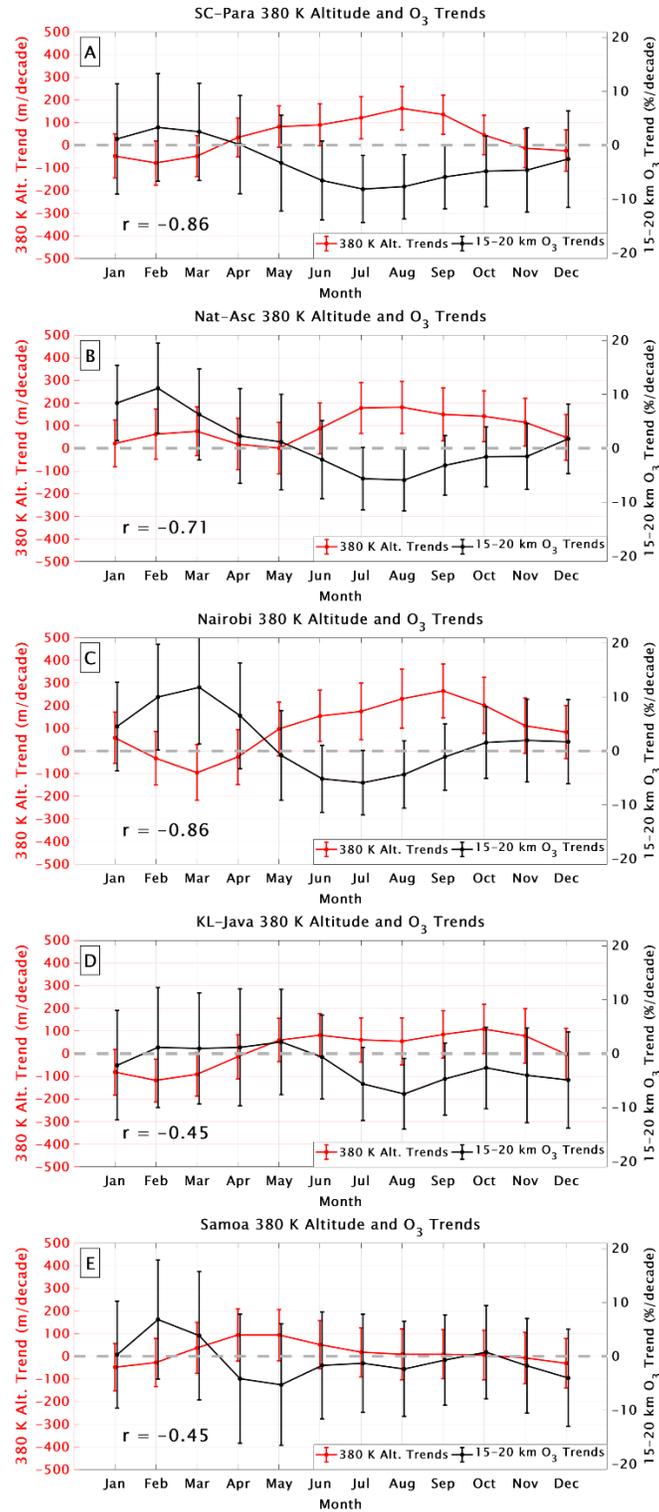


Figure S6. Monthly MLR linear trends in the altitude of the 380 K potential temperature level (red) and 15 to 20 km (LMS) partial column ozone (O_3) linear trends (black) for the five SHADOZ sites. The dots represent the values and the error bars indicate the 95% confidence intervals. Correlations between the altitude of the 380 K potential temperature surface, our proxy for the tropopause, and LMS O_3 trends are shown on each panel.