Supplement

As shown in Figure S1, there is a strong, statistically significant correlation between the GPH at 250 hPa and the tropopause altitude over Aosta, Rome and Lampedusa. As also shown in Figure A1 (panels d- f) GPH at 250 hPa is strongly anti-correlated with GPH at 850 hPa.
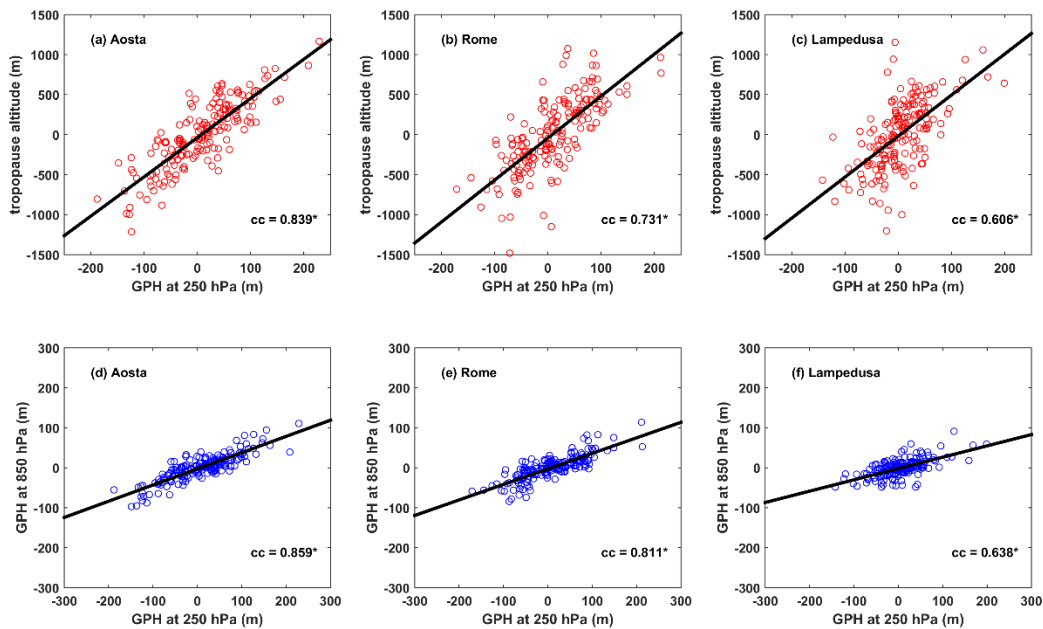
Figure S1: Correlation between the absolute anomalies (in m) between GPH at 250 hPa and tropo-pause altitude for (a) Aosta, (b) Rome, and (c) Lampedusa, and correlation between the GPH at 250 hPa and 850 hPa for (d) Aosta, (e) Rome, and (f) Lampedusa. The correlation coefficients (cc) are shown at the lower right side of each graph. Values in bold marked with an asterisk denote statistically significant correlation.

As shown in Figure S2, ozone over Rome increases significantly at higher stratospheric levels and decreases significantly at lower stratospheric levels.
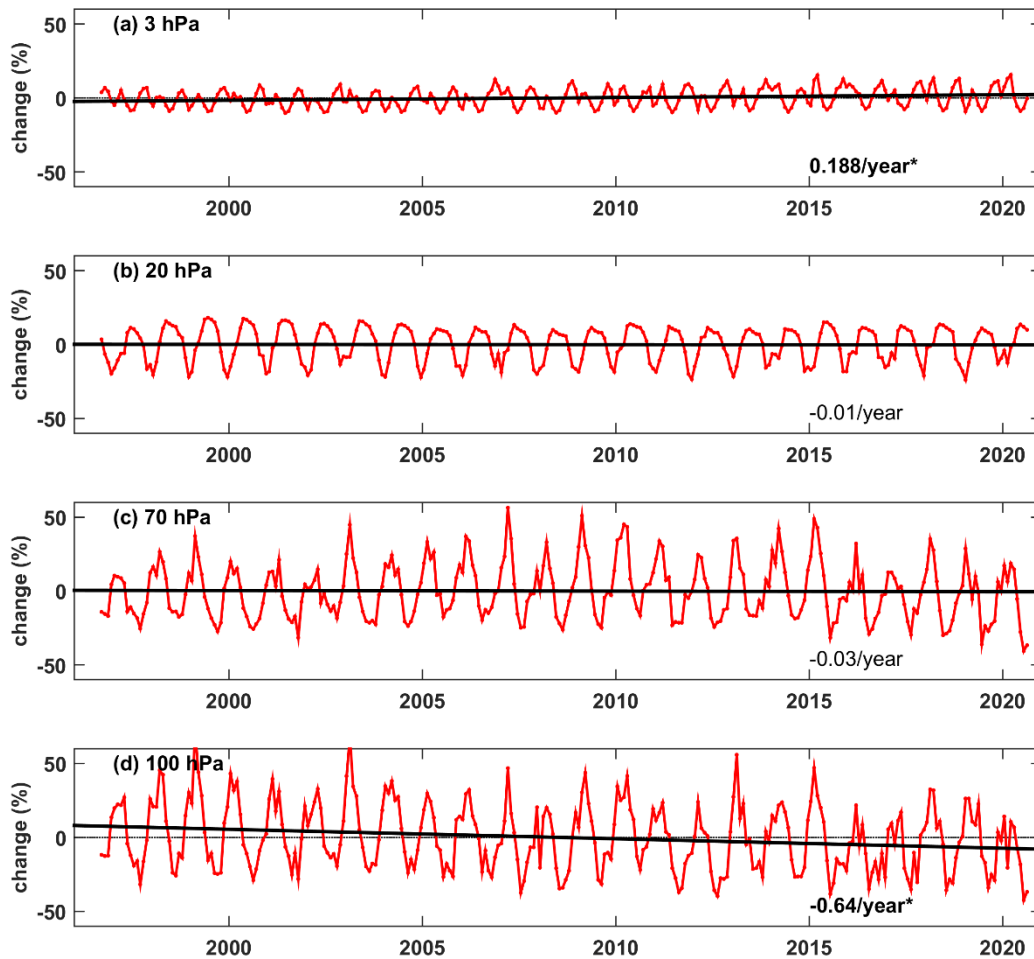
Figure S2: Variability and long-term trends (in %) of the ozone mixing ratio at different atmospheric pressure levels over Rome. Average change per year is shown at the lower right of each graph. Values in bold marked with an asterisk denote statistically significant changes.