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An evaluation of the ability of the Ozone Monitoring Instrument (OMI) to observe boundary layer ozone pollution across China: application to 2005–2017 ozone trends

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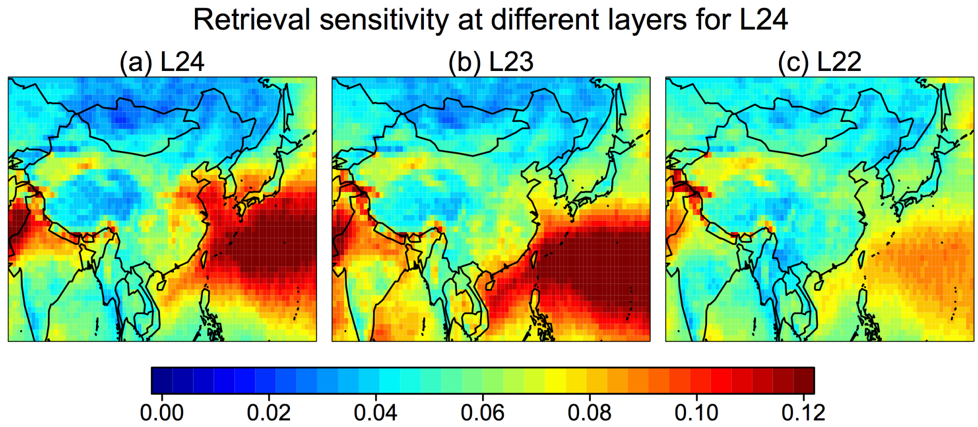

Figure S1 The sensitivity of retrieved ozone at L22-L24 to the ozone change at L24, as denoted by the columns of AK (Hayashida et al., 2015).

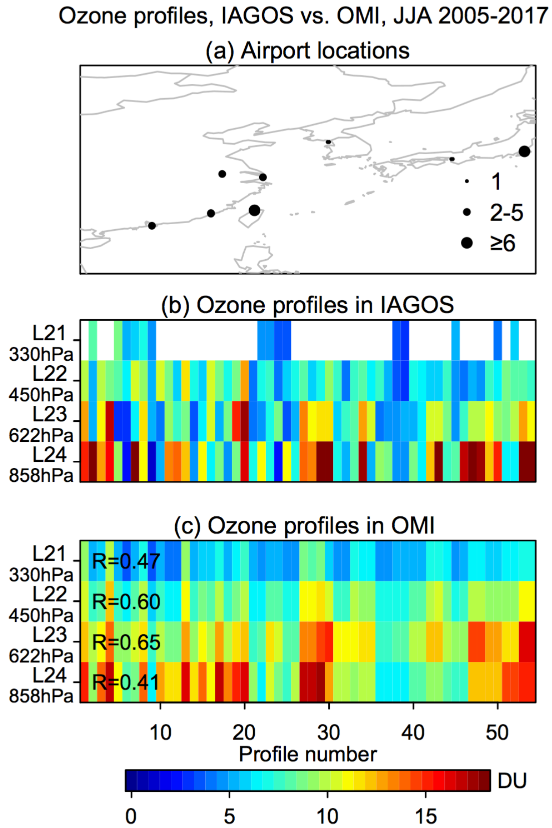

Figure S2. (a) Location and the number of tropospheric profiles at each airport in IAGOS that are coincident with OMI retrievals. We only select these profiles between 12-15 local time. (b) Ozone profiles from IAGOS, but mapped to OMI layers. The missing data at L21 is in part because we only select pixels that are within 200 km from the airport on the flight path. (c) OMI ozone profiles coincident with the ozonesondes. The correlations of unsmoothed 950 hPa ozone data in IAGOS with the OMI retrievals for different levels are shown inset. The correlation with 850-400 hPa OMI ozone is 0.59 (p<0.05)

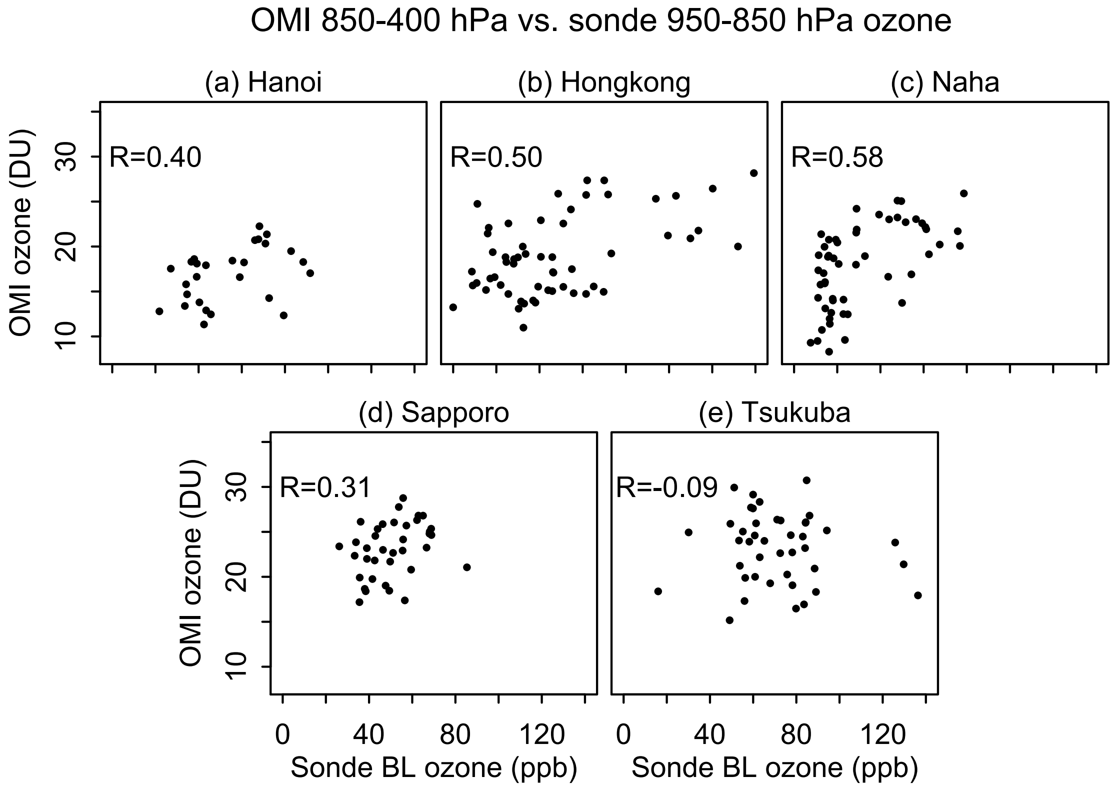

Figure S3. Relationship of unsmoothed 950 hPa ozonesonde data and OMI 850-400 hPa ozone in the five ozonesondes sites (locations can be found in Figure 4) in East Asia. The correlation is shown inset.

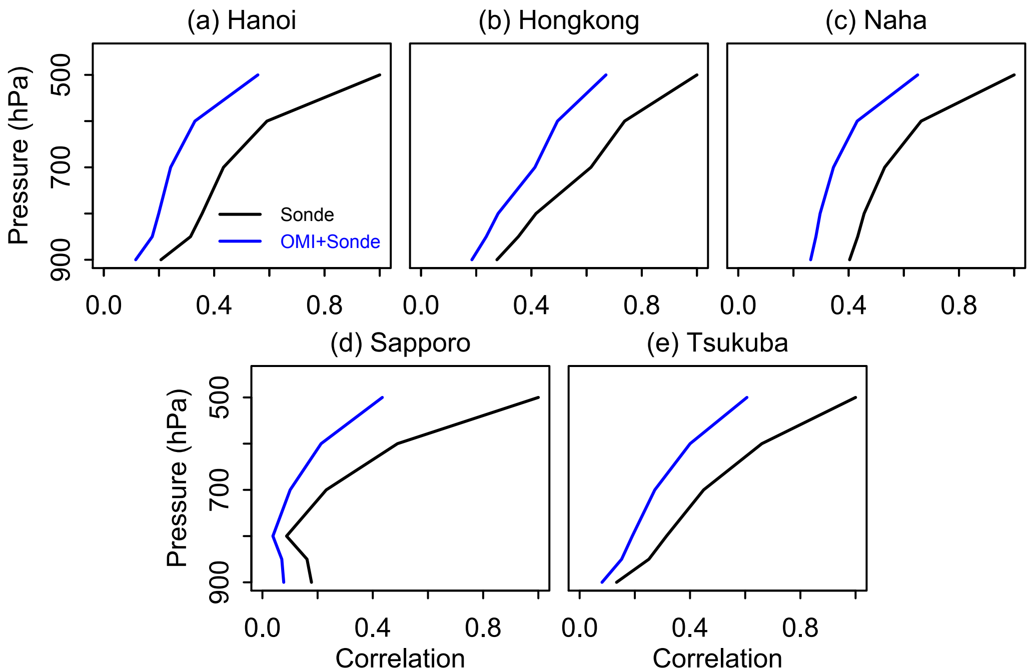

Figure S4. Correlation of OMI 850-400 hPa ozone and the boundary layer ozone assuming that the OMI were sensitive only to the free troposphere at ~500 hPa (where its sensitivity is maximum, Figure 3c) and not to the boundary layer. The black line is the correlation of ozone at different pressure levels with 500 hPa ozone in the sonde observations. The blue line is the estimated correlation of OMI 850-400 hPa with ozone at different layers if the satellite can only detect the signal at 500 hPa but not from other layers, as calculated using Equation 2. See text for more details.

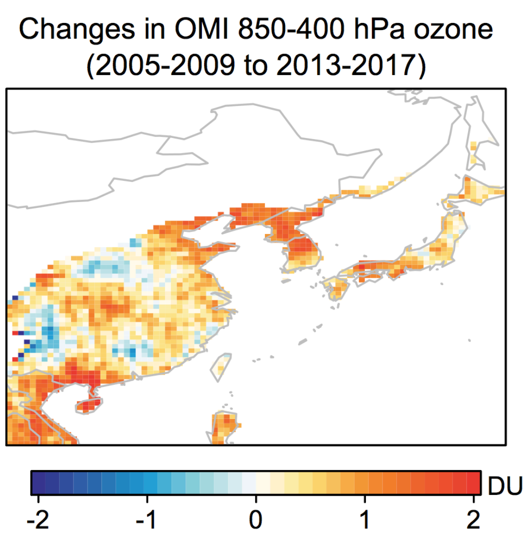

Figure S5. Difference of the mean OMI enhancements at 850-400 hPa from 2005-2009 to 2013-2017 after correcting the Pacific background. Data are only shown for regions with DOFS below 400 hPa (Figure 1a) greater than 0.30.