Geophysical Research Letters

Supporting Information for

A Post-2013 Drop-off in Total Ozone at Half of Global Ozonesonde Stations: ECC Instrument Artifacts?

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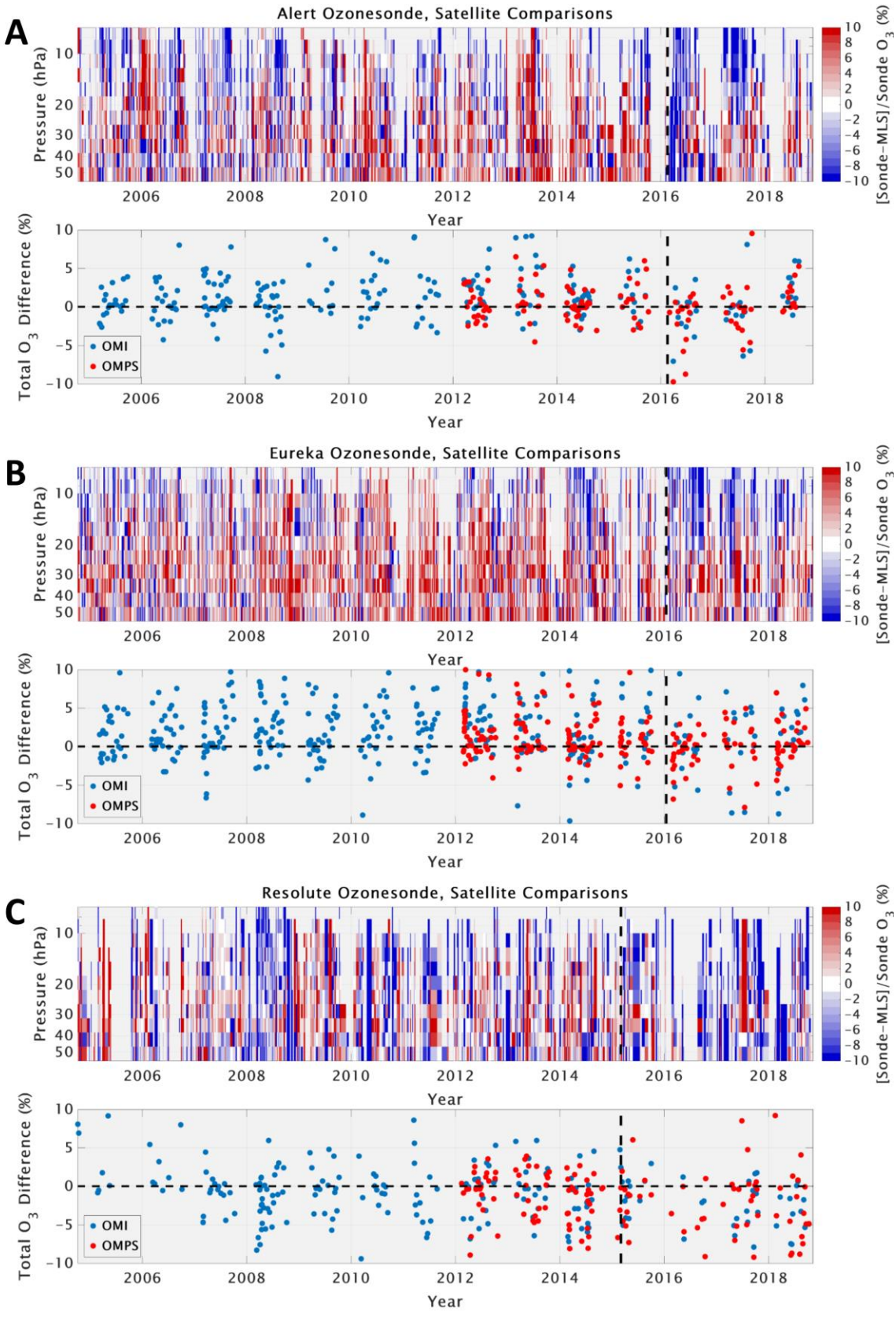
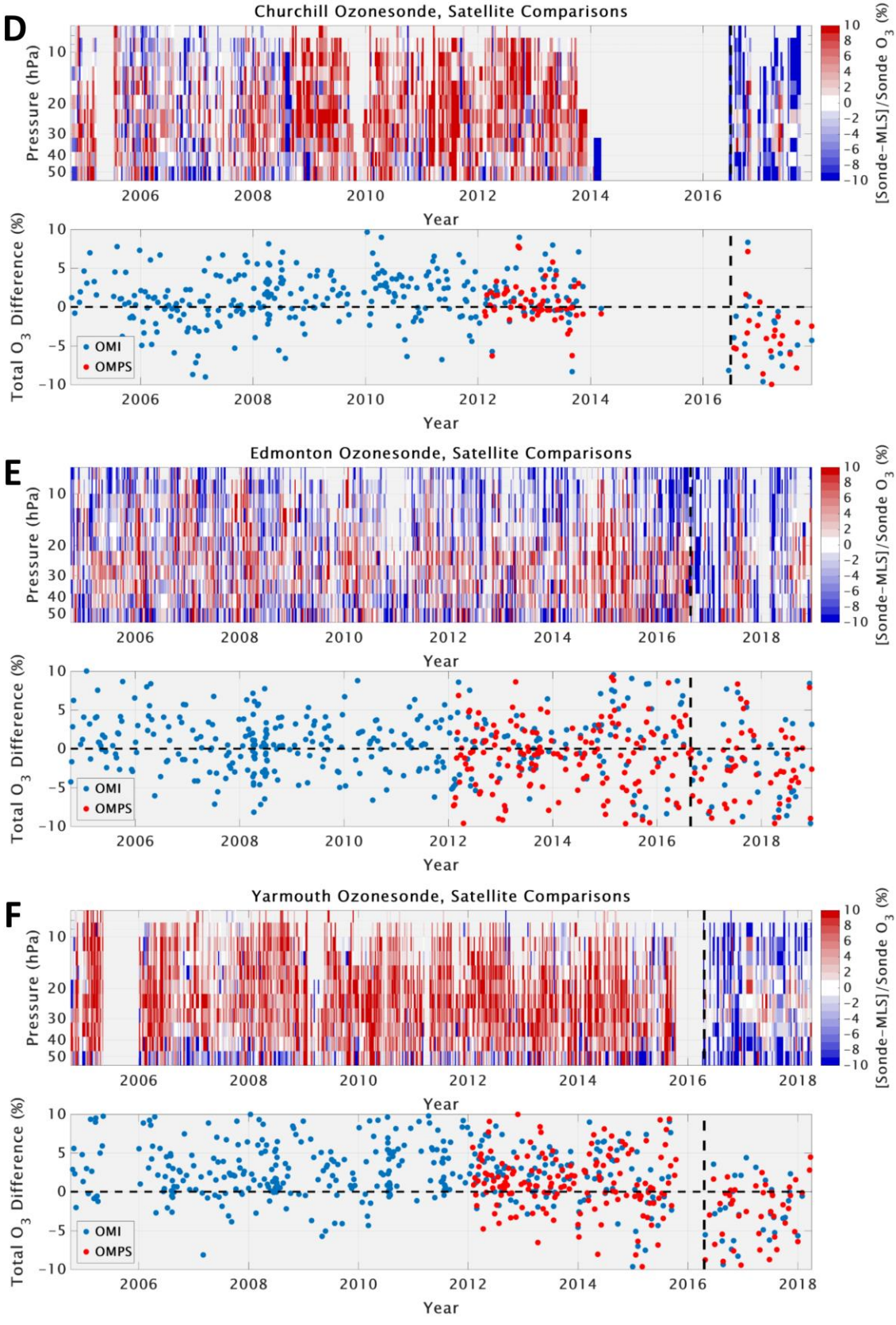
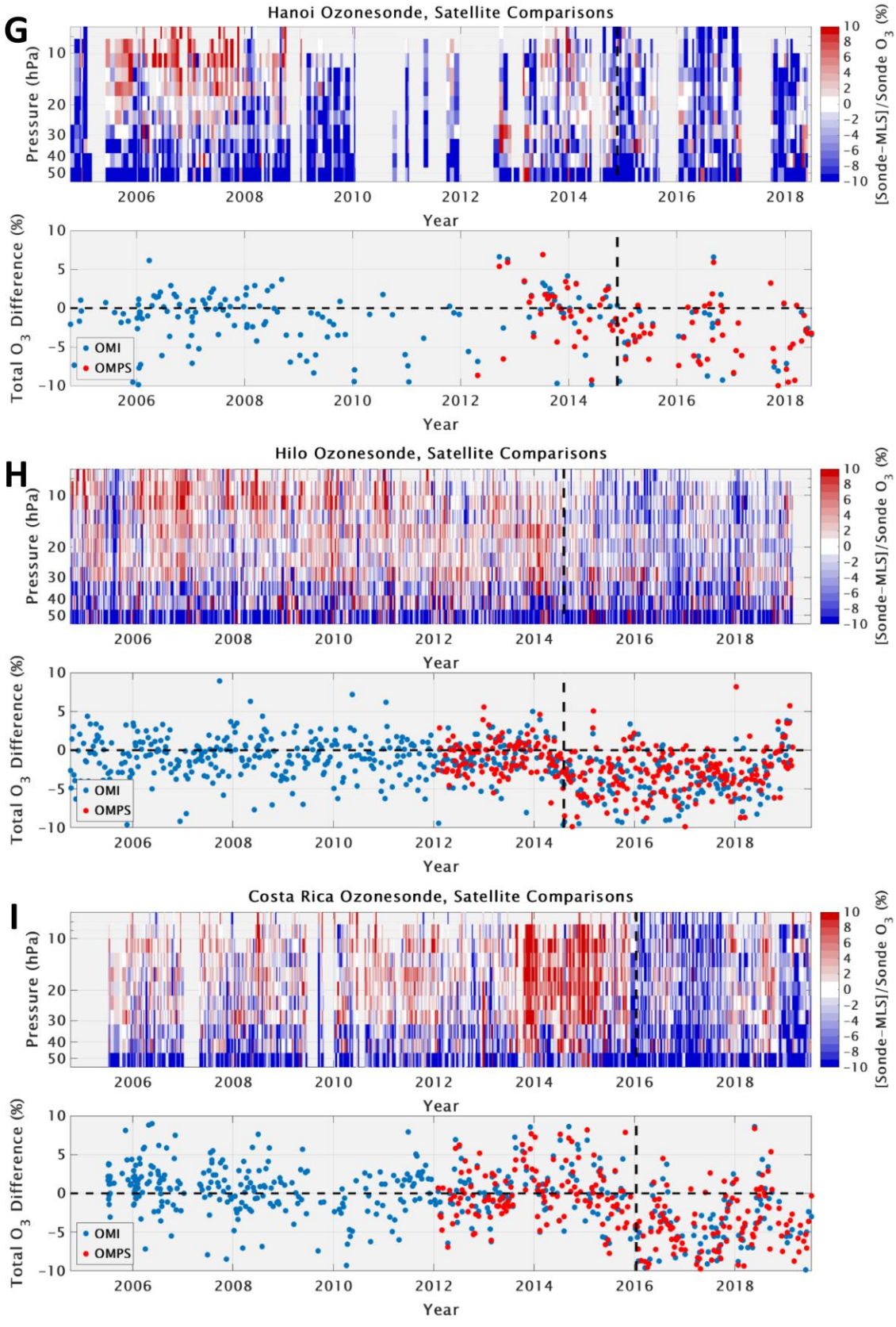
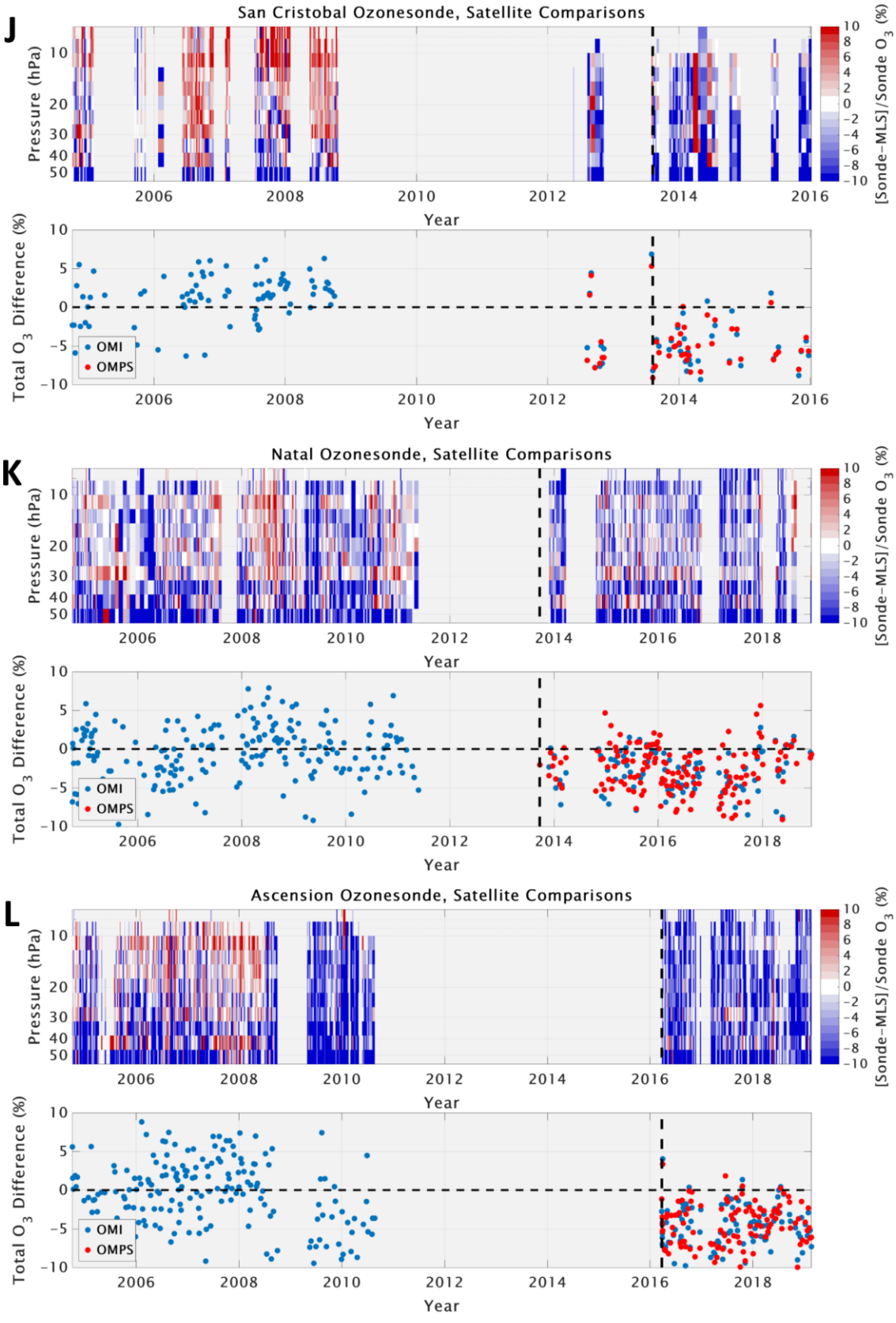

A
Alert Ozonesonde, Satellite Comparisons
Pressure (hPa)
Year
[Sonde−MLS]/Sonde O3 (%)
Total O3 Difference (%)
OMI
OMPS
B
Eureka Ozonesonde, Satellite Comparisons
C
Resolute Ozonesonde, Satellite Comparisons


D
Churchill Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde−MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
E
Edmonton Ozonesonde, Satellite Comparisons
F
Yarmouth Ozonesonde, Satellite Comparisons


G
Hanoi Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde−MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
H
Hilo Ozonesonde, Satellite Comparisons
I
Costa Rica Ozonesonde, Satellite Comparisons


J
San Cristobal Ozonesonde, Satellite Comparisons
Pressure (hPa)
Year
[Sonde−MLS]/Sonde O3 (%)
Total O3 Difference (%)
OMI
OMPS
K
Natal Ozonesonde, Satellite Comparisons
L
Ascension Ozonesonde, Satellite Comparisons

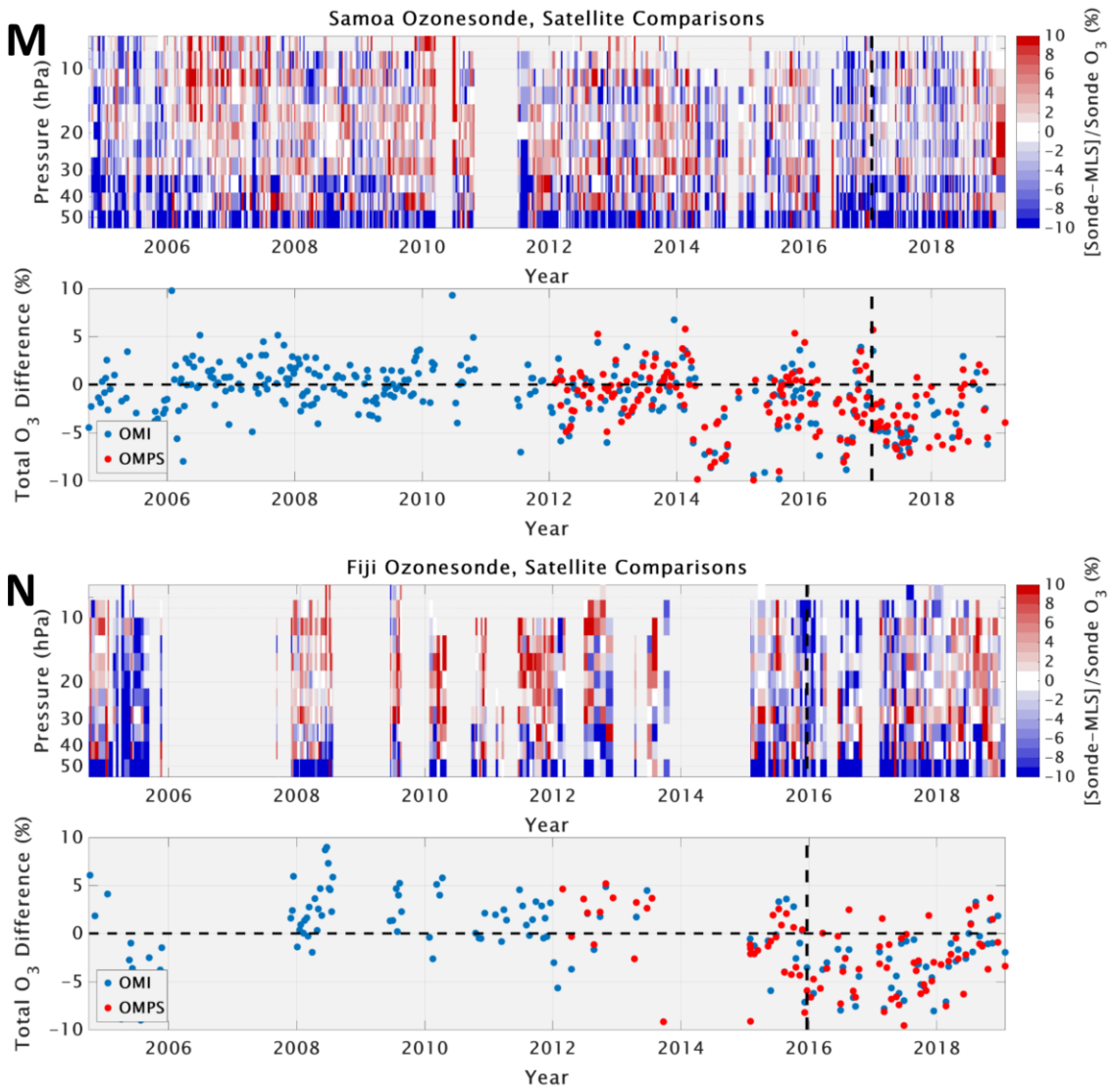
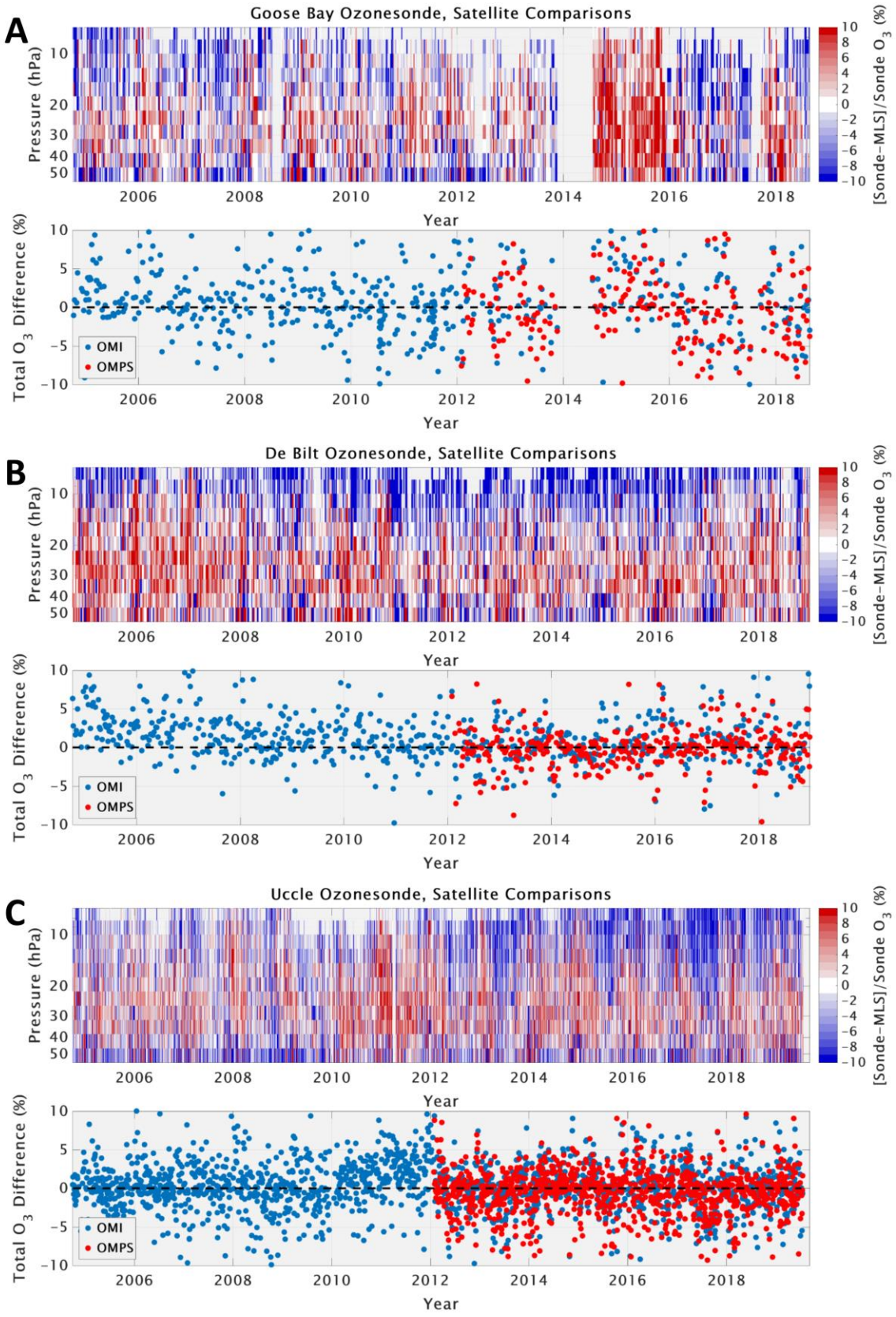
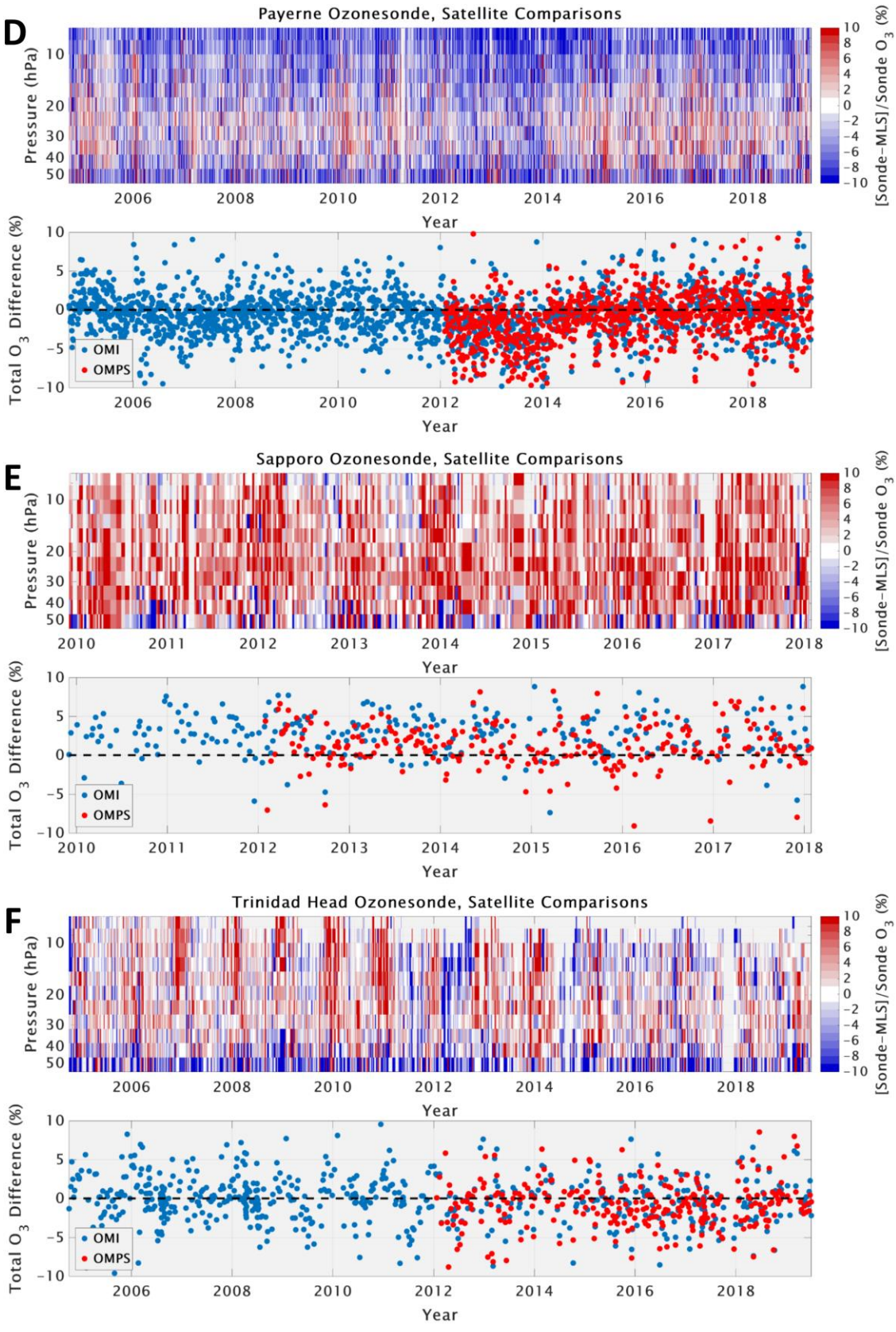
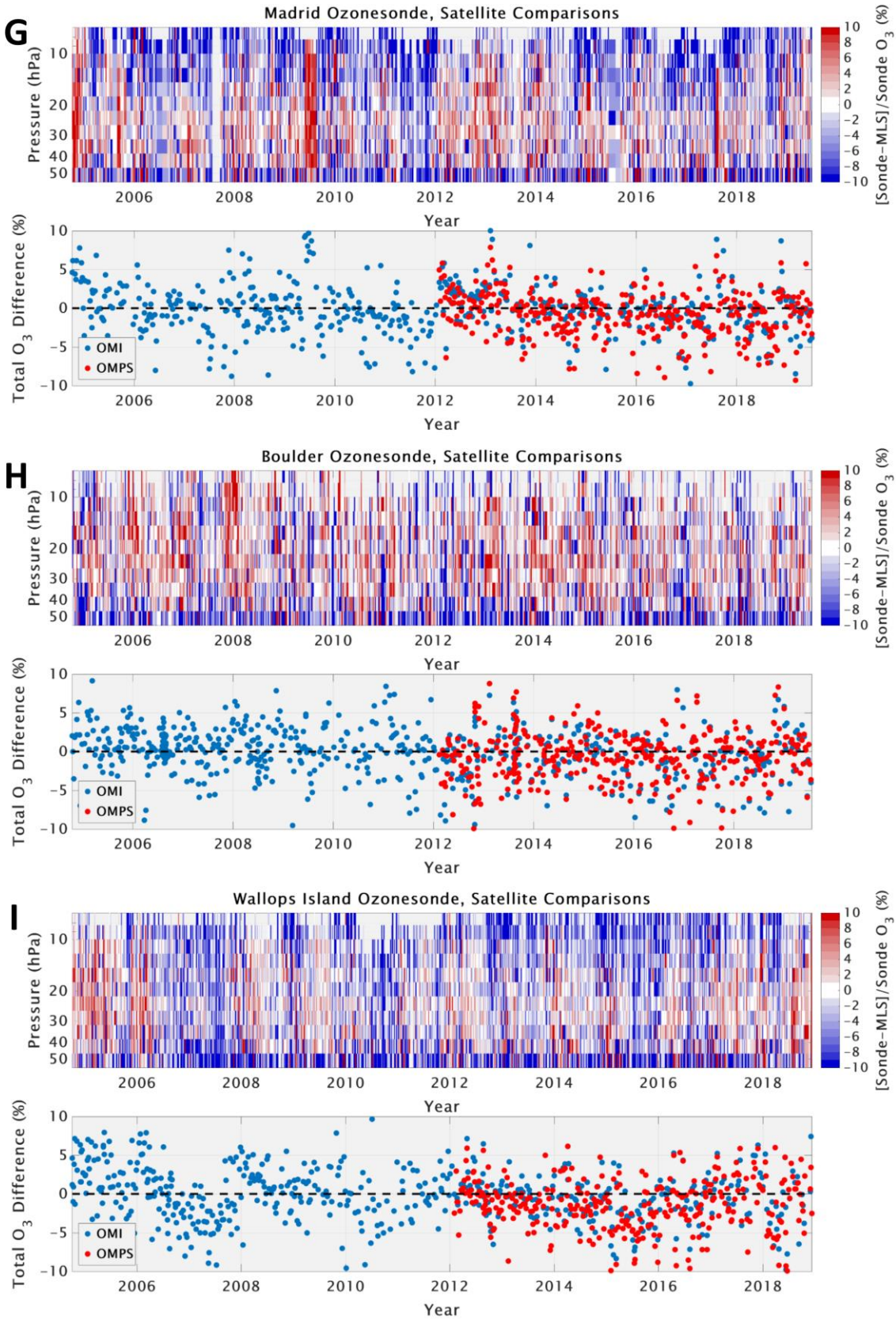


Figure S1. As in Figure 1, but for the 14 remaining affected ECC ozonesonde sites that exhibit a > 2 % drop-off in TCO relative to OMI. Note that the only "affected" Type2 station is Natal, Brazil. See Table 1 for more metadata on each site.


A
Goose Bay Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde−MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
B
De Bilt Ozonesonde, Satellite Comparisons
C
Uccle Ozonesonde, Satellite Comparisons


D
Payerne Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde-MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
E
Sapporo Ozonesonde, Satellite Comparisons
F
Trinidad Head Ozonesonde, Satellite Comparisons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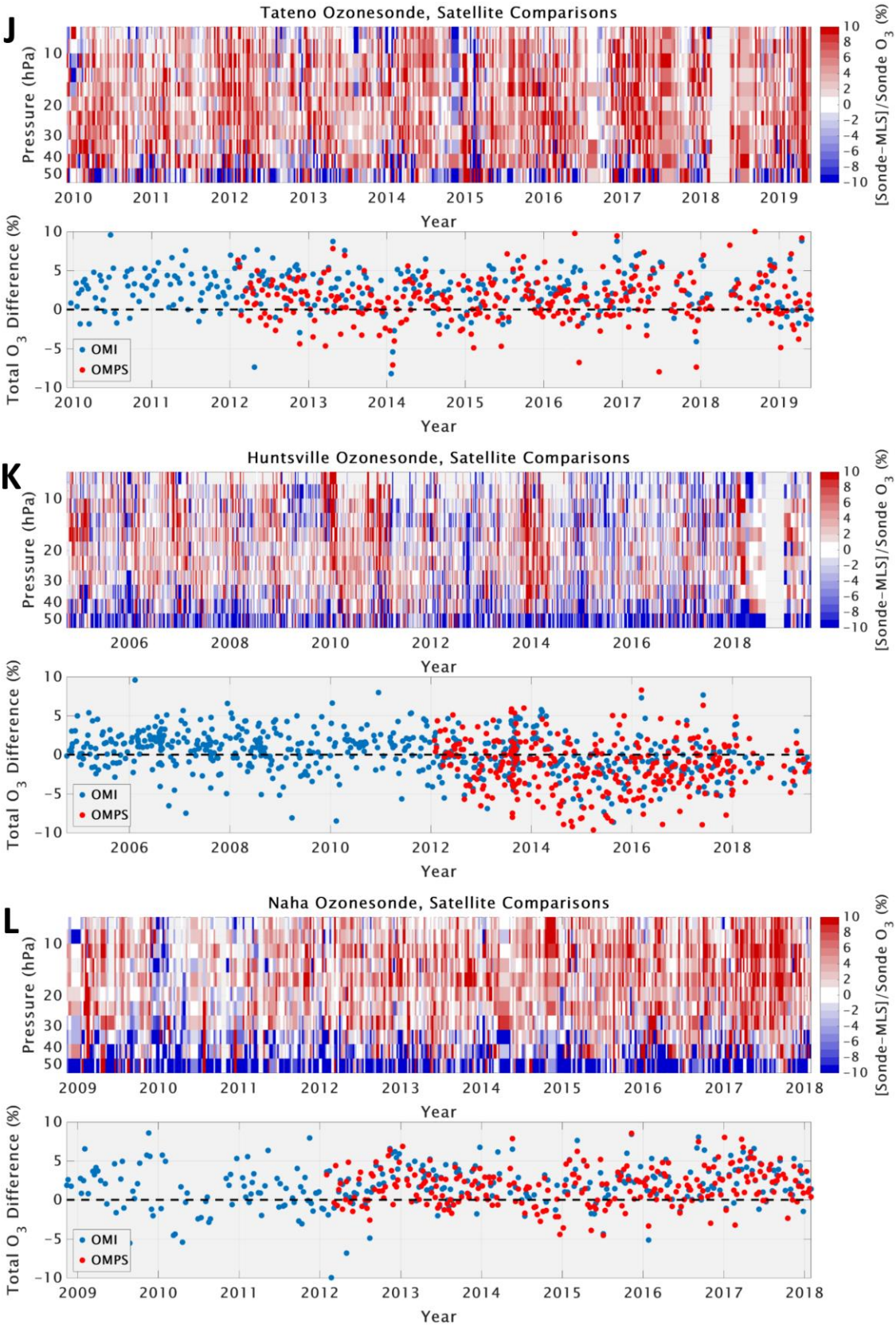
Madrid Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde−MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
H
Boulder Ozonesonde, Satellite Comparisons
I
Wallops Island Ozonesonde, Satellite Comparisons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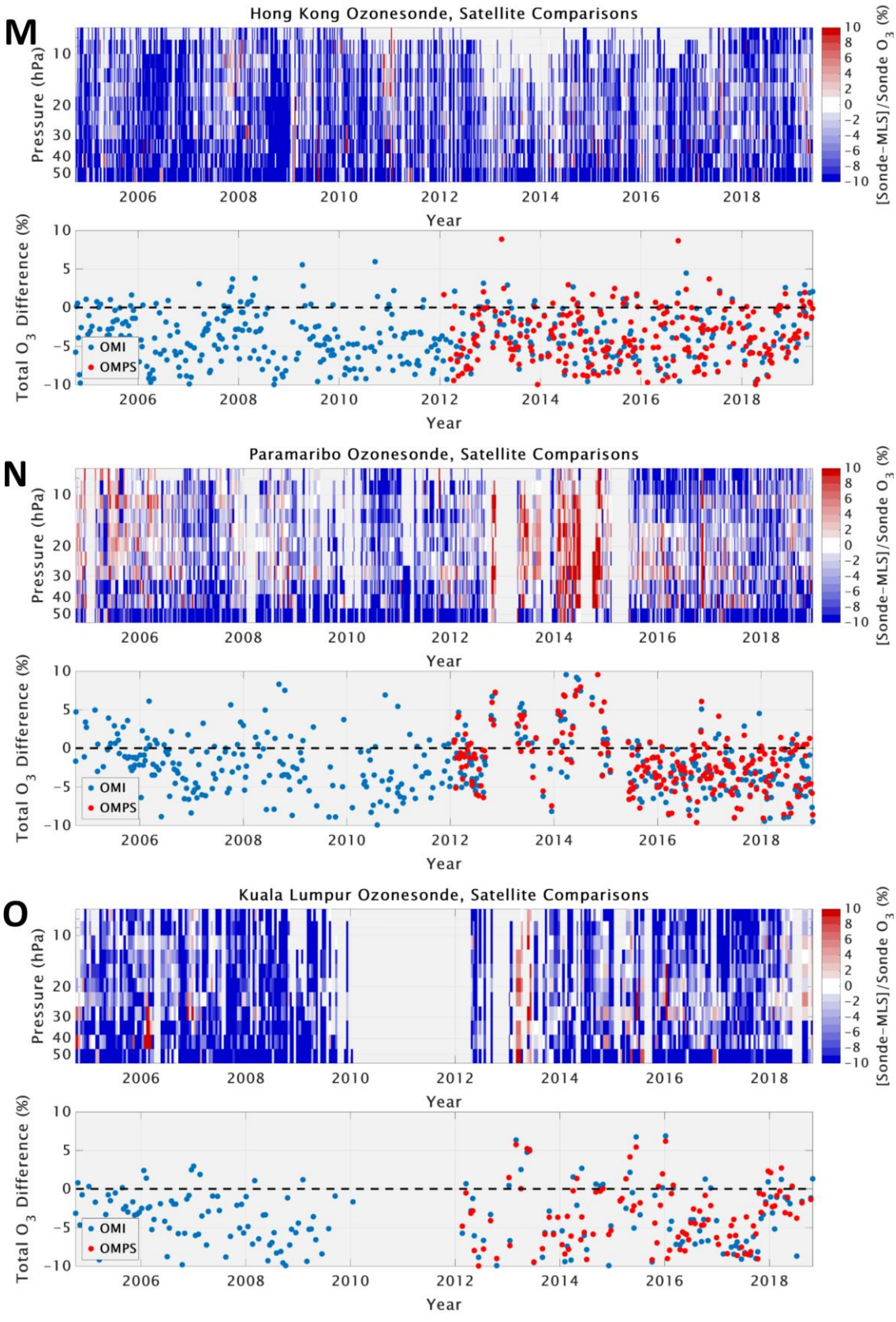
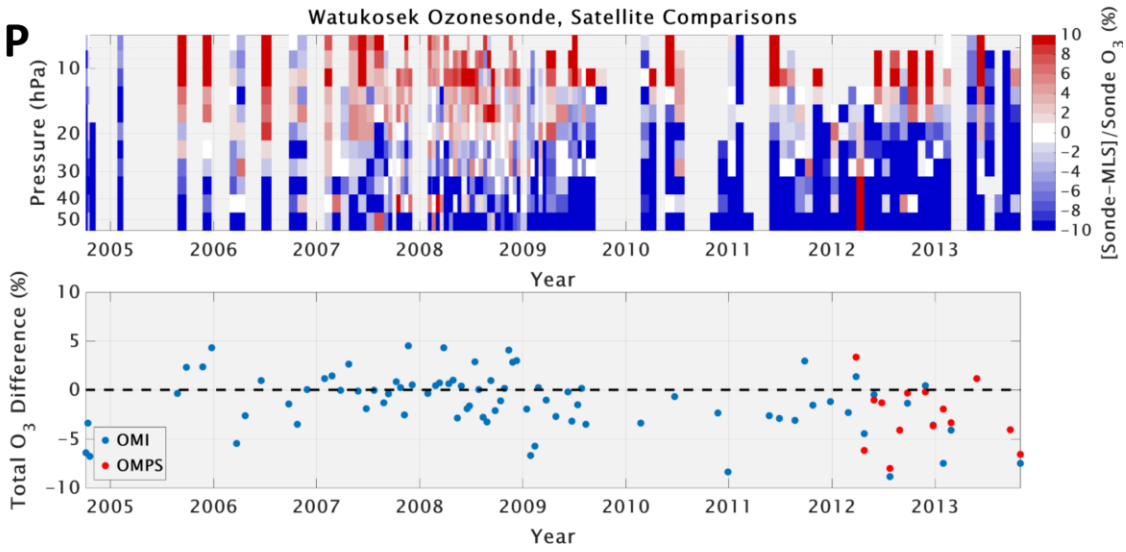
Tateno Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde−MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
K
Huntsville Ozonesonde, Satellite Comparisons
L
Naha Ozonesonde, Satellite Comparisons


M
Hong Kong Ozonesonde, Satellite Comparisons
Pressure (hPa)
[Sonde−MLS]/Sonde O_3 (%)
Year
Total O_3 Difference (%)
OMI
OMPS
N
Paramaribo Ozonesonde, Satellite Comparisons
O
Kuala Lumpur Ozonesonde, Satellite Comparisons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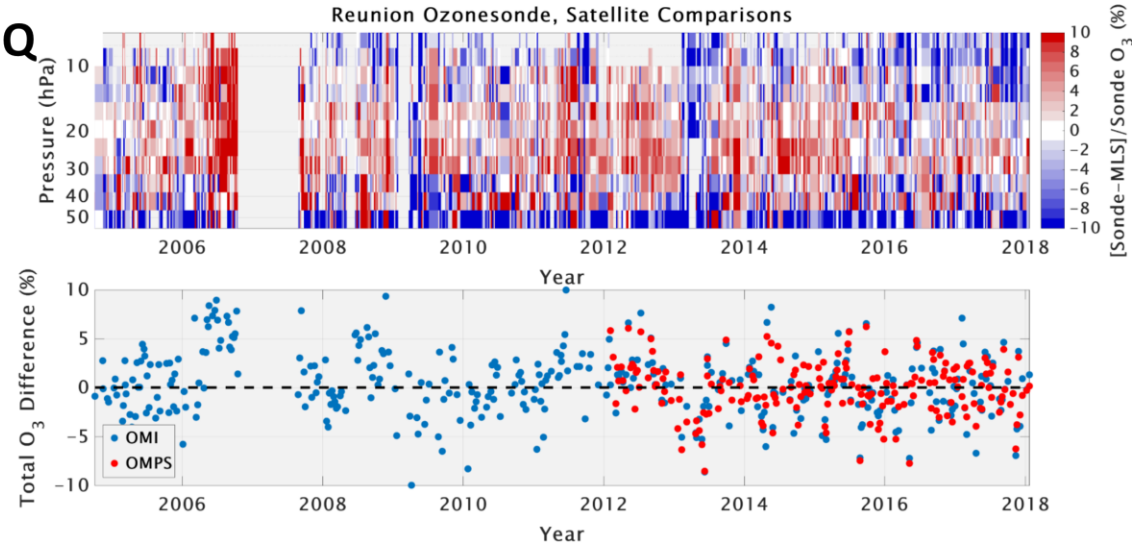
Watukosek Ozonesonde, Satellite Comparisons
Pressure (hPa)
Year
[Sonde−MLS]/Sonde O3 (%)
Total O3 Difference (%)
OMI
OMPS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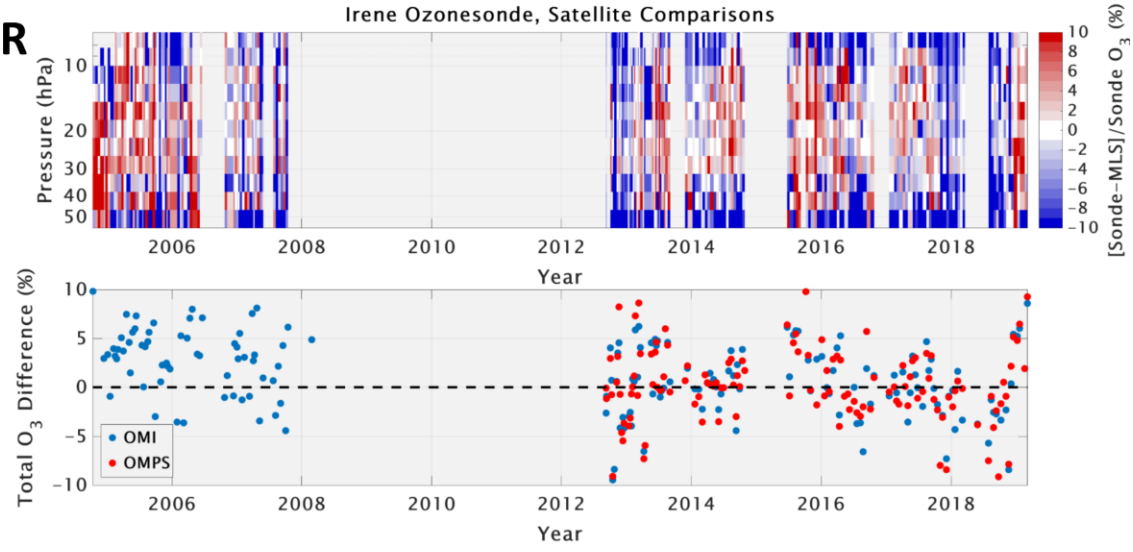
Reunion Ozonesonde, Satellite Comparisons
Pressure (hPa)
Year
[Sonde−MLS]/Sonde O3 (%)
Total O3 Difference (%)
OMI
OMPS


R
Irene Ozonesonde, Satellite Comparisons
Pressure (hPa)
Year
[Sonde−MLS]/Sonde O3 (%)
Total O3 Difference (%)
OMI
OMPS

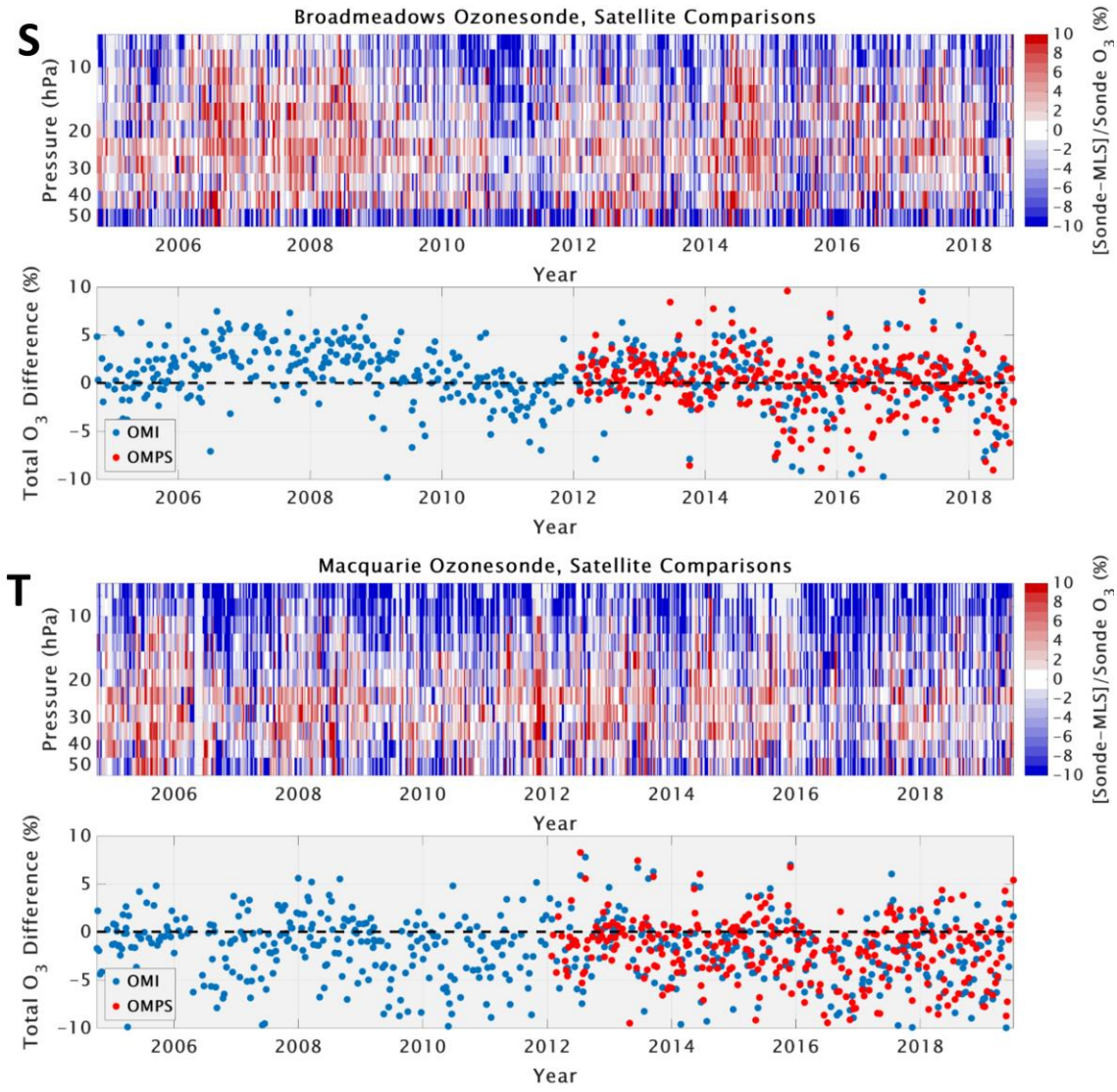


Figure S2. As in Figure 1, but for the 20 reference ECC ozonesonde sites (i.e. those that do not exhibit a drop-off in TCO relative to OMI). See Table 1 for more metadata on each site.

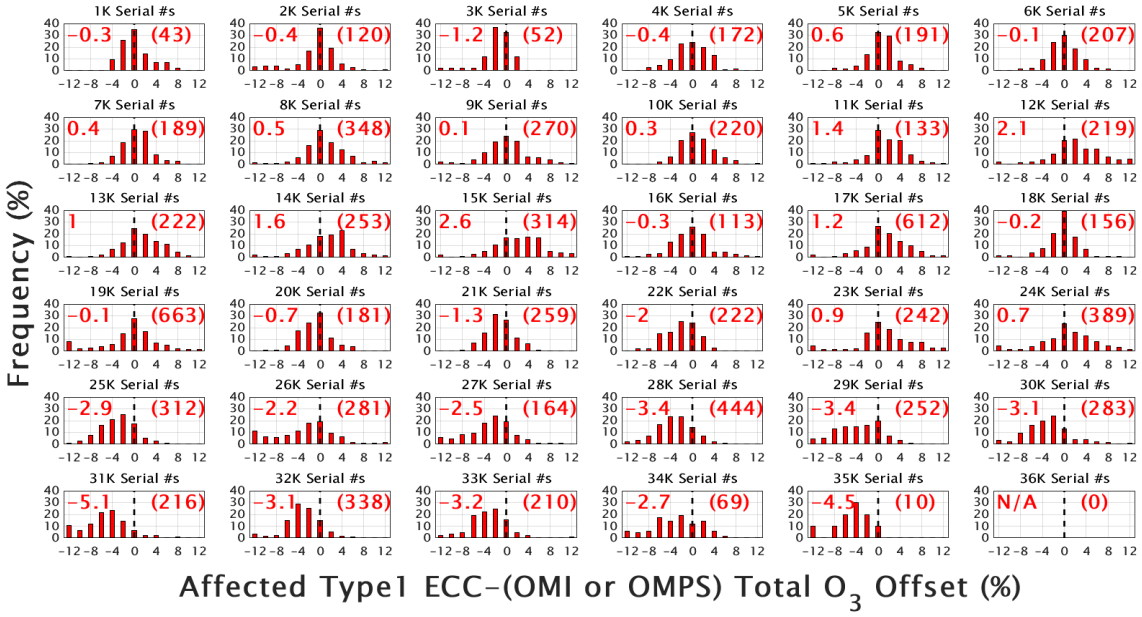


Figure S3. The same histograms of TCO offset for affected Type1 ECC ozonesondes as in Figure 4, but for all serial numbers compared to OMI and OMPS TCO measurements (16 total sites).

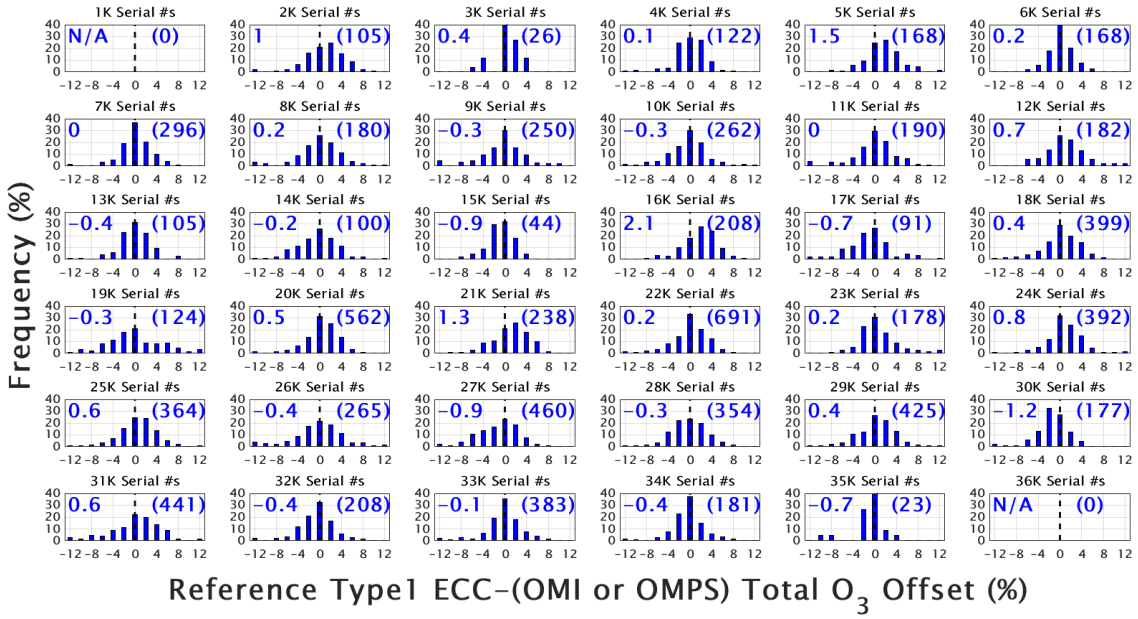


Figure S4. The same histograms of TCO offset for reference Type1 ECC ozonesondes as in Figure 4, but for all serial numbers compared to OMI and OMPS TCO measurements (12 total sites).

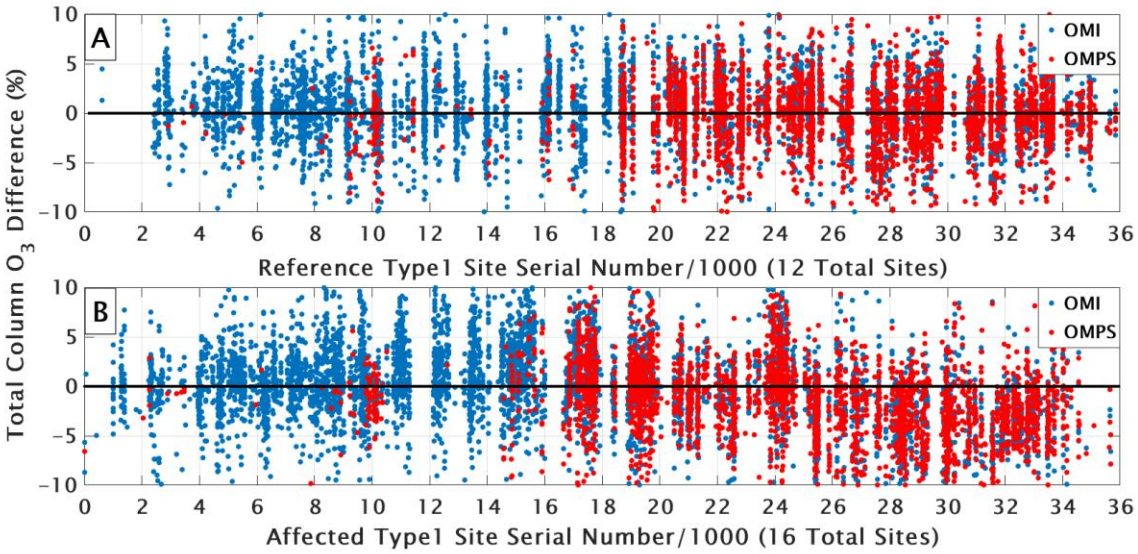


Figure S5. TCO differences compared to OMI (blue) and OMPS (red) for all Type1 ECC serial numbers, separated by the 12 references (A) and 16 affected (B) sites. This displays the commingling of the good and poorly-performing ECCs within small sets of serial numbers, and shows that separating our analyses by site is necessary.

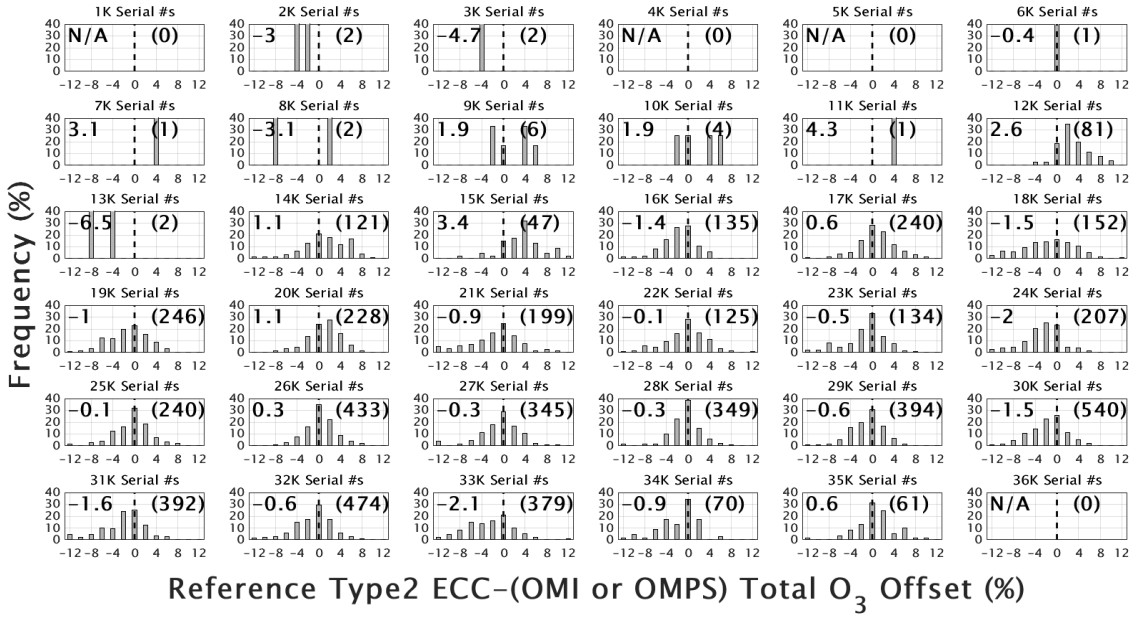


Figure S6. Histograms of TCO offset for reference Type2 ECC ozonesondes, but for all serial numbers compared to OMI and OMPS TCO measurements (8 total sites). Note that this excludes the only "affected" Type2 station: Natal, Brazil.

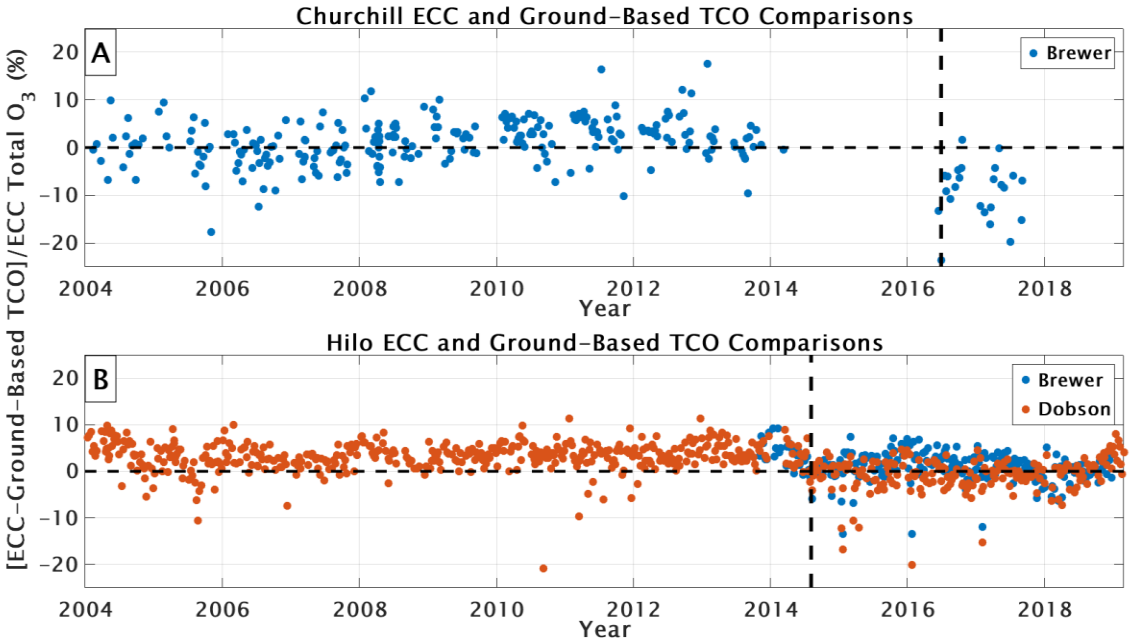


Figure S7. Time series of comparisons between ECC and ground-based TCO measurements at Churchill, Canada (A), and Hilo, HI (B). Horizontal dashed lines indicate the 0 % line for TCO comparisons, and the vertical black dashed lines indicate the date of ECC drop-off (see Table 1).

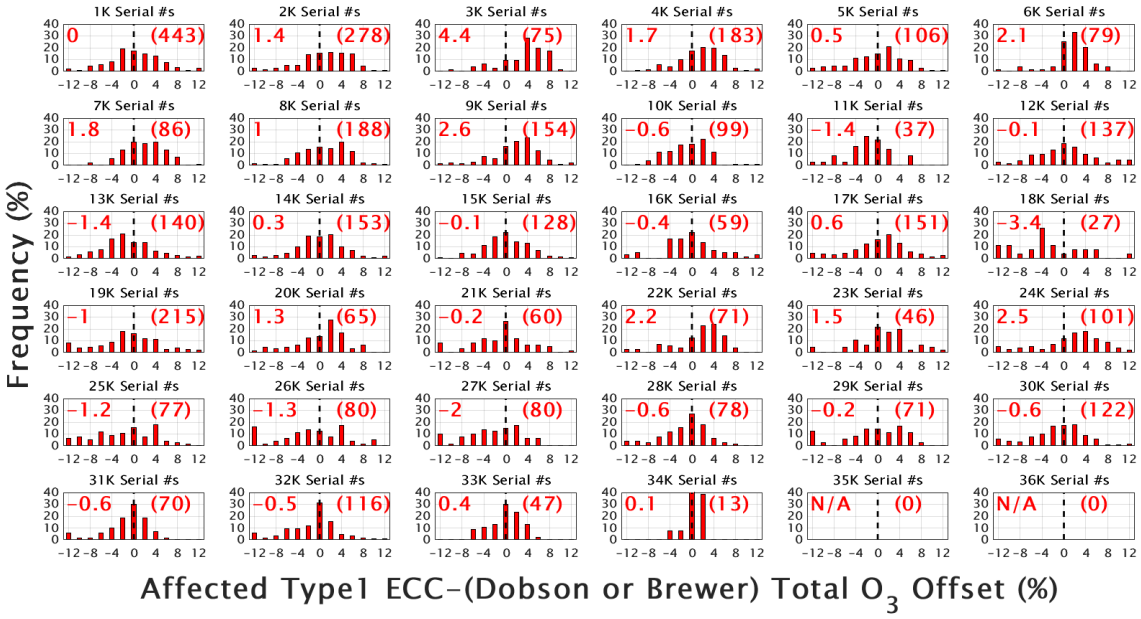


Figure S8. As in Figure S3, but comparisons are between affected Type1 ECCs and ground-based TCO (8 affected Type1 sites have ground-based data).

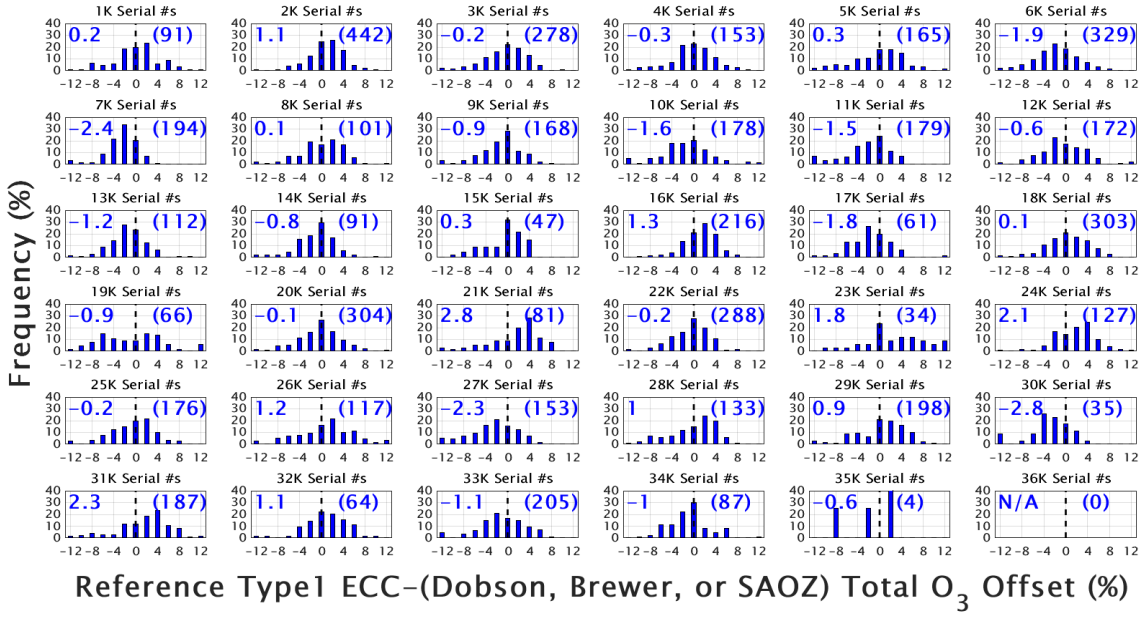


Figure S9. As in Figure S4, but comparisons are between reference Type1 ECCs and ground-based TCO (7 reference Type1 sites have ground-based data).

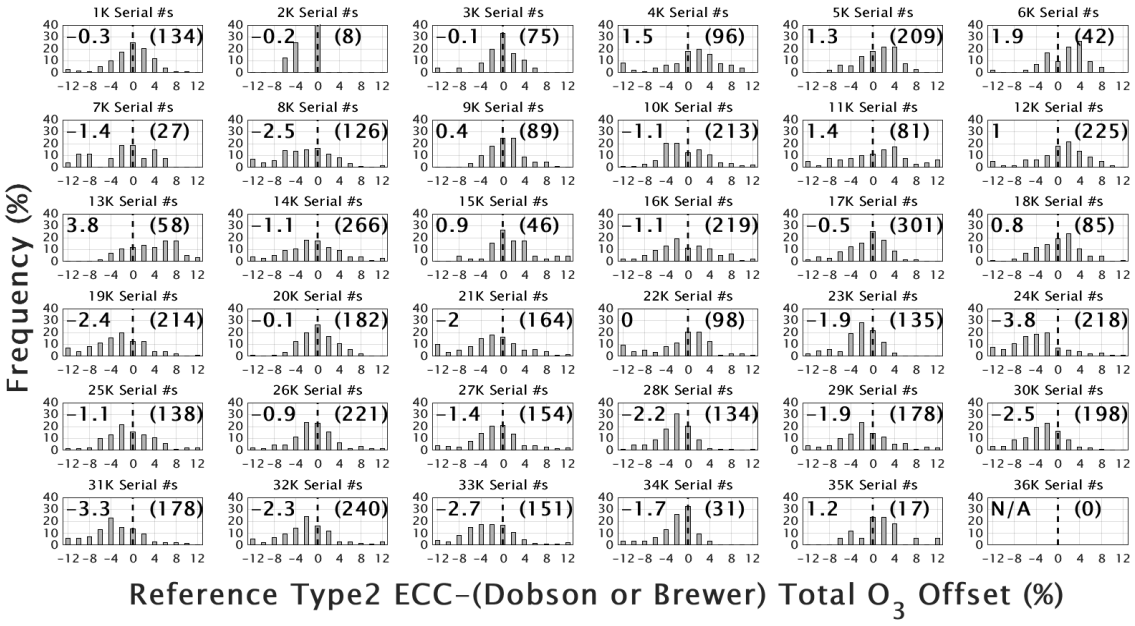


Figure S10. As in Figure S6, but comparisons are between reference Type2 ECCs and ground-based TCO. Note that this excludes the only "affected" Type2 station: Natal, Brazil (7 affected Type2 sites have ground-based data).

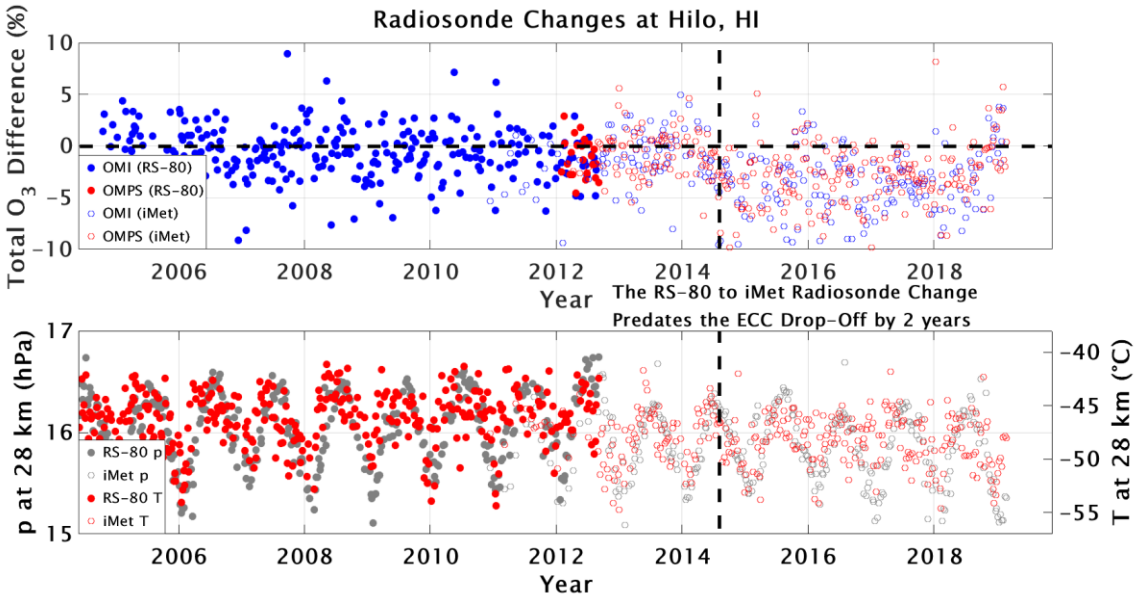


Figure S11. Top panel: Time series of TCO percent differences between Hilo ECC, and OMI (blue) and OMPS (red) TCO. Bottom panel: Pressure (grey) and temperature (red) values at 28 km altitude (representative of the mid-stratosphere). The solid dots show when the ECC ozonesonde was paired with a Vaisala RS-80 radiosonde, and the open dots show when the ECC was paired with an InterMet iMet radiosonde. The vertical dashed lines indicate the date of the ECC TCO drop-off at Hilo (see Table 1), and the horizontal line on the top plot indicates the 0 % line for TCO comparisons.