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Supplement of

Arctic tropospheric ozone: assessment of current knowledge and model performance

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Table S1. Emissions and meteorology used in the models

Model name	Biogenic emissions	Forest fire emissions	Meteorology
CESM2.0	MEGANv2.1	CMIP6	Fully interactive with prescribed SST and SIC
CMAM	None	CMIP6	Nudged to ERA-Interim reanalysis
DEHM	MEGANv2	GFAS	Nudged to ERA-Interim reanalysis
EMEP MSC-W	EMEP scheme (Simpson et al., 2012)	FINN (based on Wiedinmyer et al., 2011)	Driven by 3-hourly data from the Integrated Forecast System (IFS) at ECMWF
GEOS-Chem	MEGANv2.1 with update from Guenther et al (2012)	GFEDv4.1	Driven by the GEOS meteorology from the NASA data assimilation office
GISS-E2.1	Isoprene:Guenther et al. (2015); Terpenes: ORCHIDEE; Online DMS, Sea-salt and dust	CMIP6	Nudged to NCEP reanalysis
MATCH	MEGANv2	CMIP6	ERA-Interim reanalysis 6-hourly
MATCH-SALSA	MEGANv2	CMIP6	RCA4
MRI-ESM2	Monthly climatological biogenic VOC emissions are from Horowitz et al. (2003)	CMIP6	Nudged to the 6-hourly Japanese 55-year Reanalysis (JRA55)
OsloCTM	MEGAN-MACC constant at 2010 level	GFEDv4.1	Driven by 3-hourly data from the Integrated Forecast System (IFS) at ECMWF
UKESM1	Isoprene and monoterpenes interactive with land surface vegetation scheme	Prescribed from CMIP6 dataset	Nudged to ERA-Interim reanalysis
WRF-Chem	MEGAN2.1	GFED	Nudged to NCEP Final Analysis (FNL)

Table S.2: Stations with ozone sonde data used in the study. Number of soundings per year that was used is indicated. Data were retrieved from The World Ozone and Ultraviolet Radiation Data Centre (WOUDC), woudc.org and from Network for the Detection of Atmospheric Composition Change (NDACC), www.ndacc.org

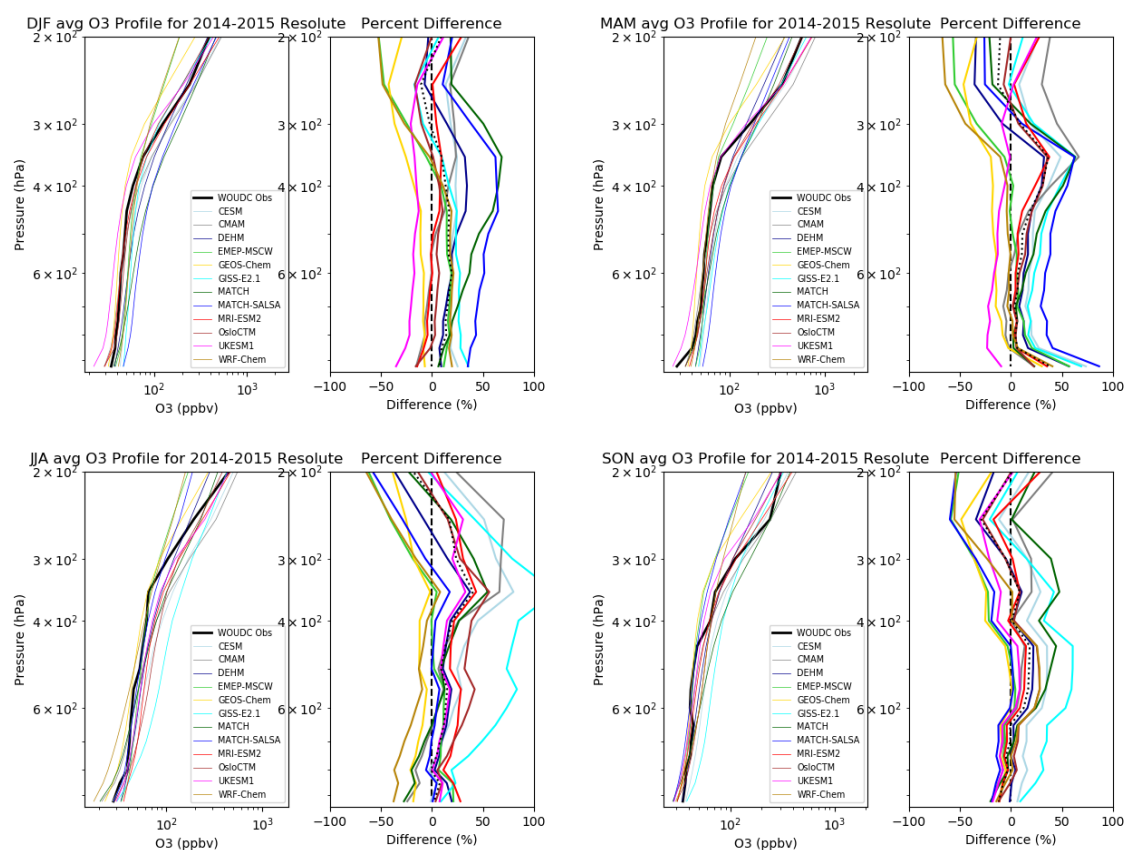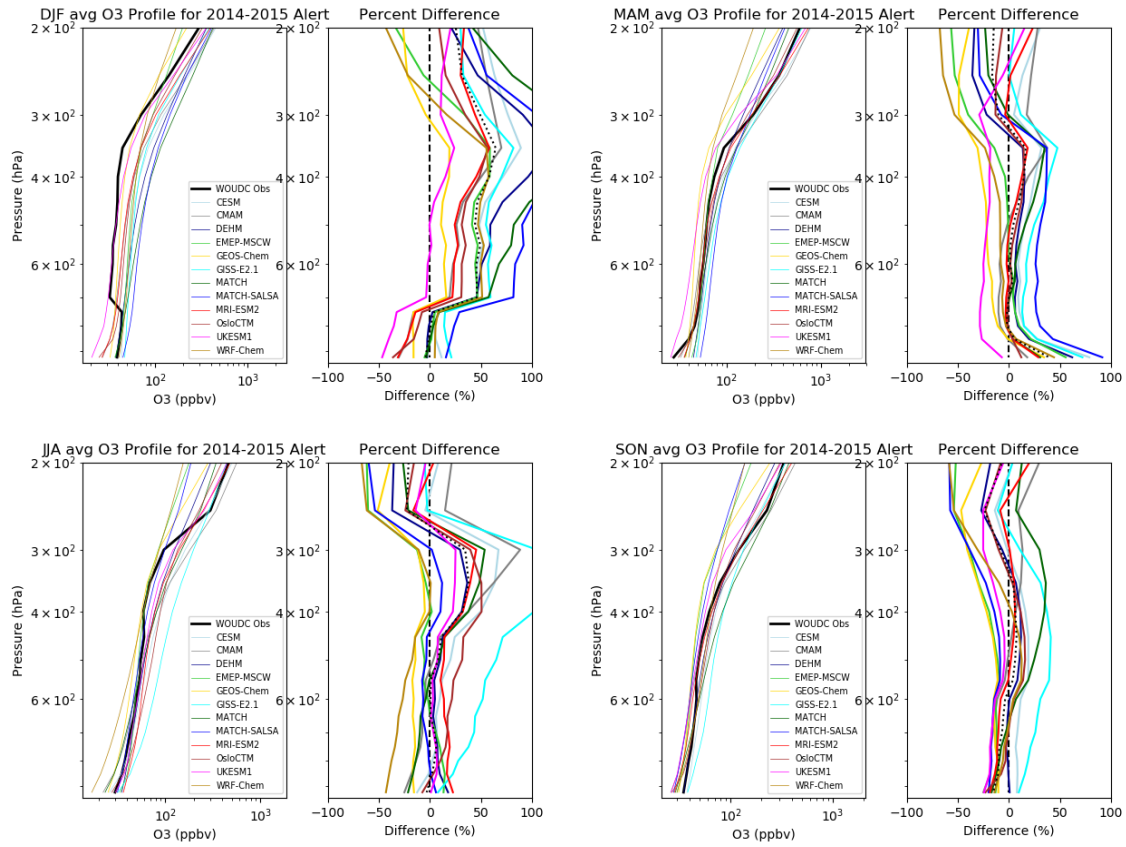| Station name and country	Latitude	Longitude	2014	2015
Alert (CA)	82.5 N	62.3 W	52	27
Eureka (CA)	80.1 N	86.4 W	68	46
Ny Ålesund (DE)	78.9 N	11.9 E	85	82
Resolute (CA)	74.7 N	95.0 W	52	36
Scoresbysund (DK)	70.5 N	22.0 W	48	44
Sodankylä (FI)	67.4 N	26.7 E	57	42

Resolute:

Figure S.1(a): Same as Figure 8 in the main paper, but for the other ozonesonde Arctic locations (Resolute).
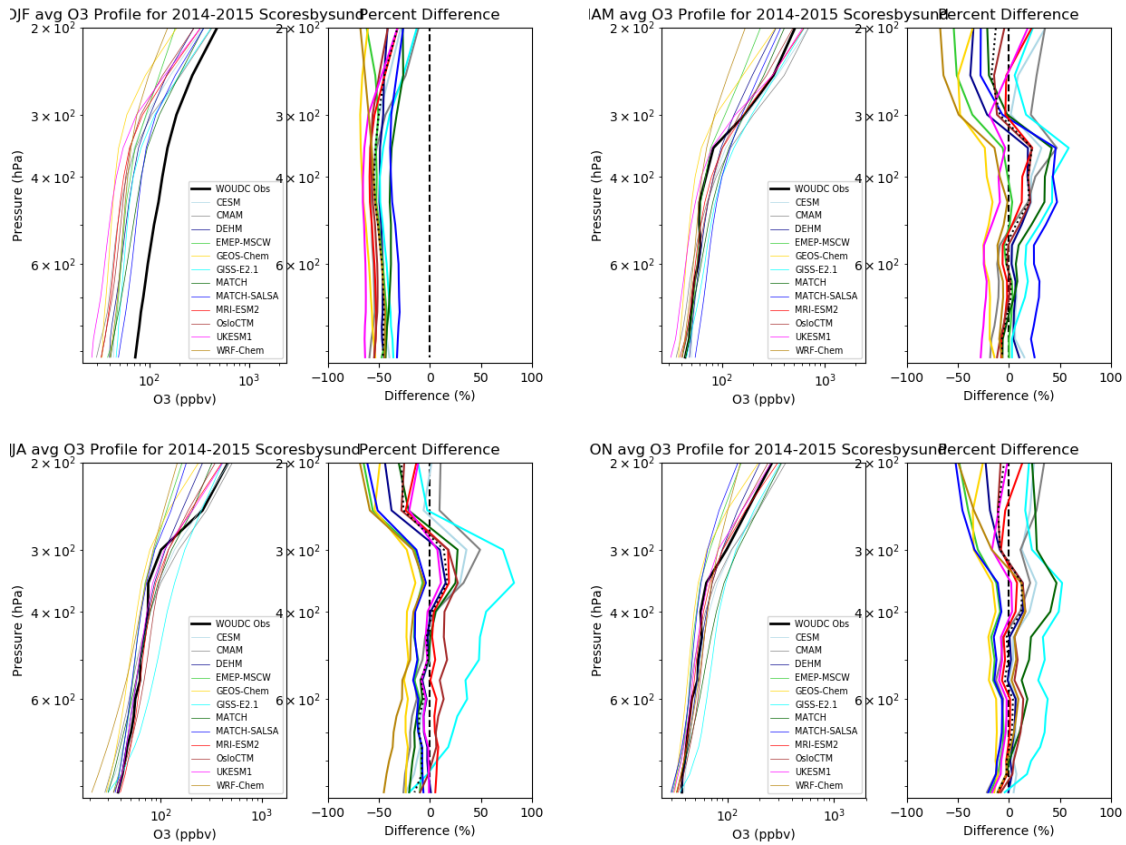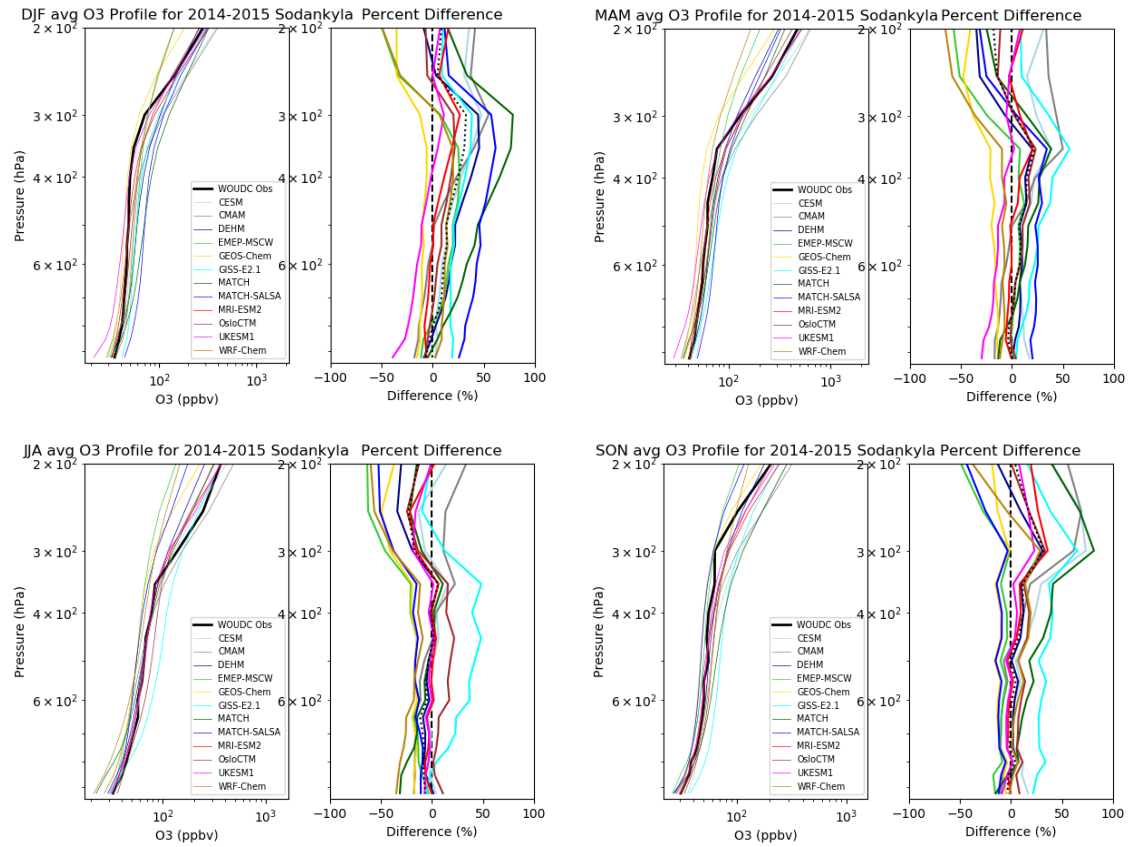
Alert:

Scoresbysund:

Figure S.1(b & c): Same as Figure 8 in the main paper, but for the other ozonesonde Arctic locations (Alert and Scoresbysund).

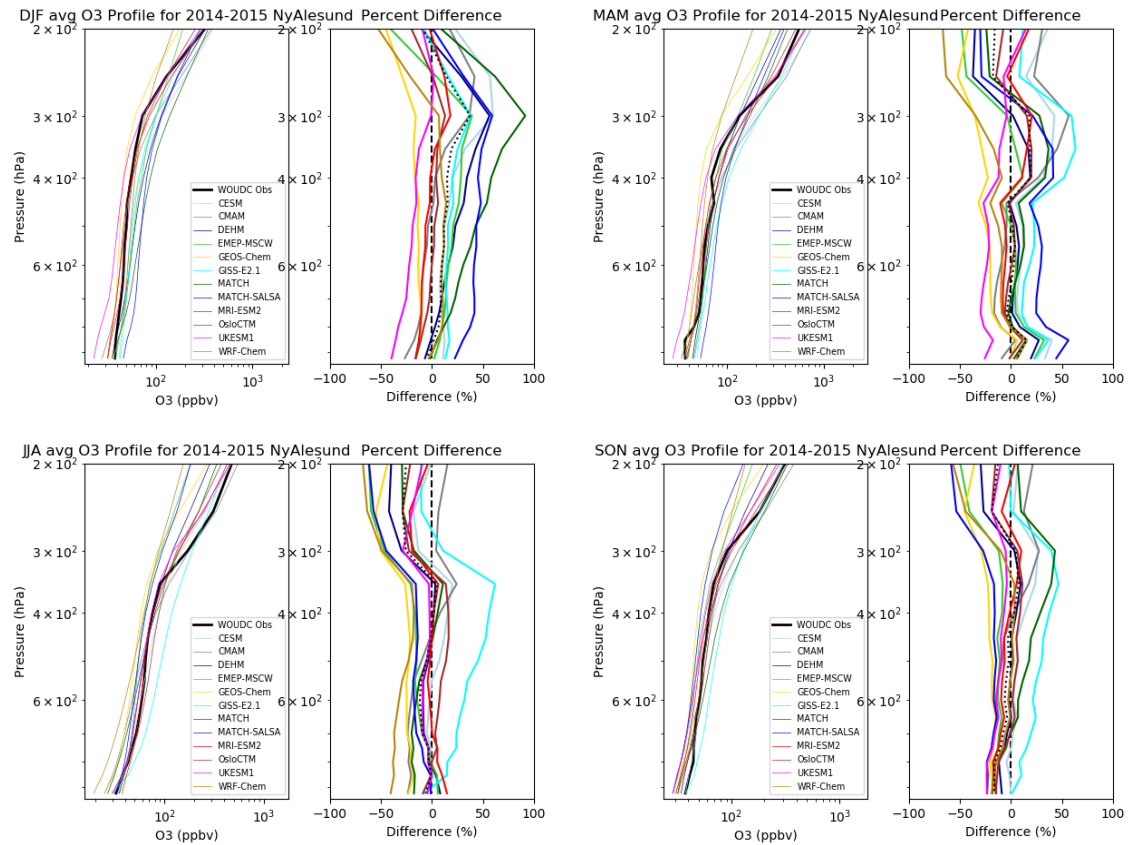**Sodankyla:**

Ny Alesund:

Figure S.1(d & e): Same as Figure 8 in the main paper, but for the other ozonesonde Arctic locations (Sodankyla and Ny Alesund).
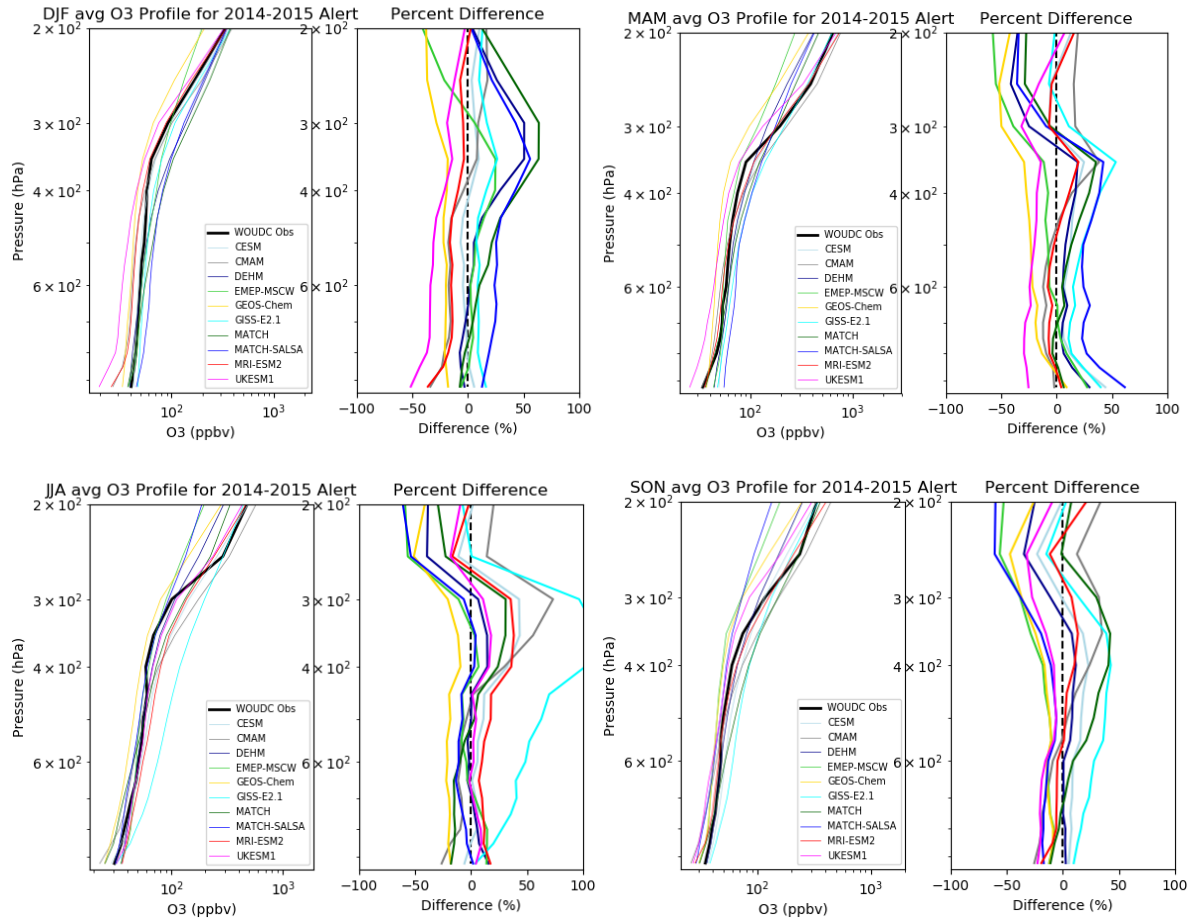
Figure S.2: Comparison between observed and AMAP models' ozone seasonal averages for 2014-15 at Alert, NV, Canada. Similar to Alert in Figure S.1, but these use 3-hourly model output instead of monthly average model output. Despite that difference, the patterns in model bias are the same.