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Supplement of

The effect of dry and wet deposition of condensable vapors on secondary organic aerosols concentrations over the continental US

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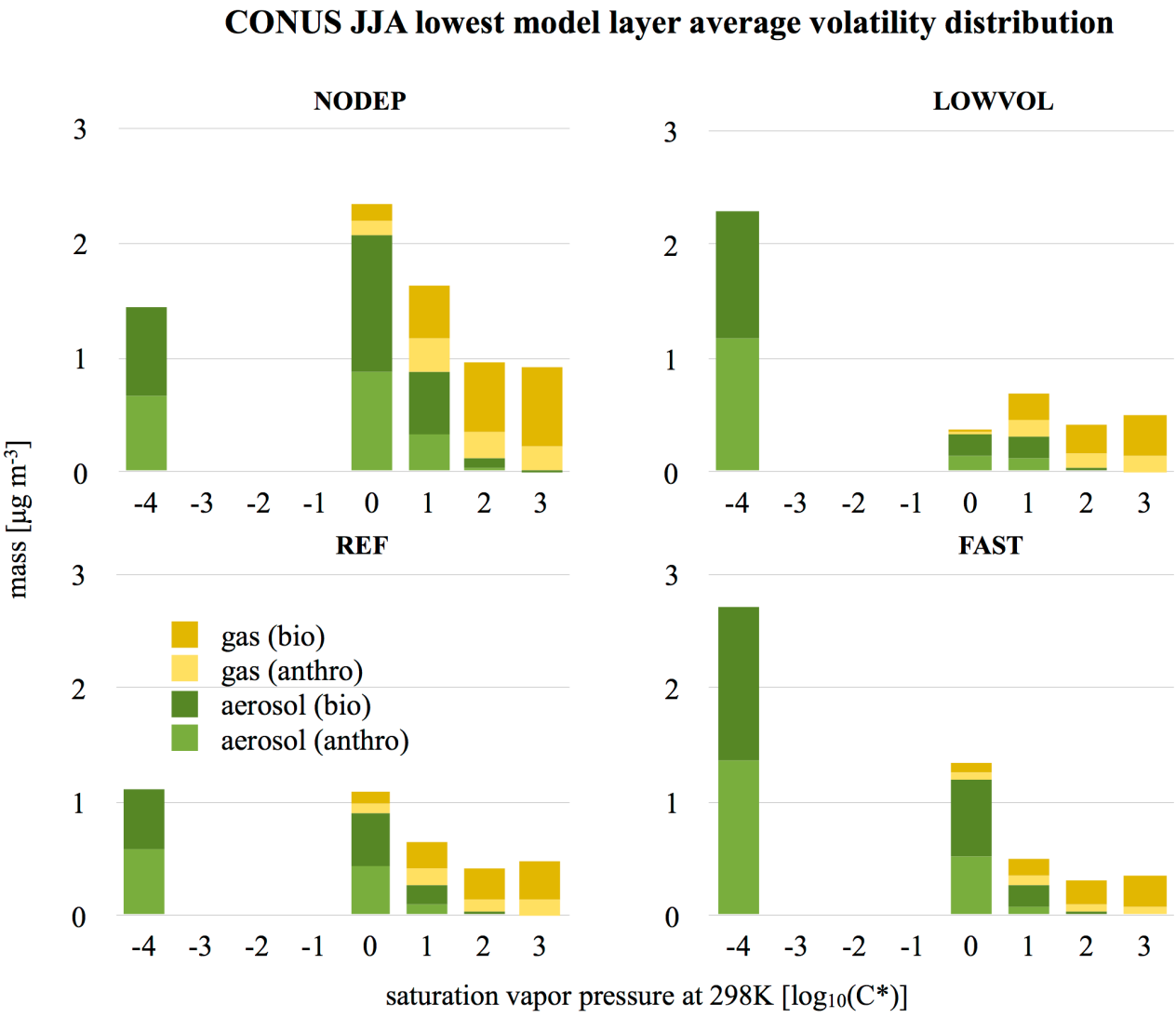

Figure S1. Continental United States, lowest model layer, summer months (June, July, August) average SOA volatility for the case without SVOC deposition (NODEP), the reference case (REF), and the two volatility sensitivity studies (FAST, LOWVOL).

Table S1. SOA precursors and mapping to SAPRC species. Respective SOA mass yields are found in Table 1 in Lane et al. (2008b).

MOZART species	**SAPRC species**
BIGENE	OLE2
BIGALK	ALK5
TOLUENE	ARO1
BENZENE	ARO2
XYLENES	ARO2
ISOP	ISO
APIN	TERP
BPIN	TERP
LIMON	TERP

Table S2. Mapping of emitted species as provided in the emissions input (AQMEII phase 2 data, CB05 speciation) onto the MOZART mechanism. Lumped structure species PAR, OLE and IOLE are converted into MOZART lumped molecules species assuming a (mole-wise) fractional contribution of 0.14, 0.02, and 0.84 of C3H6, BIGENE and BIGALK (based on measurements by Borbon et al., 2013) and the identities given in the table below.

MOZART species	**Emissions input species**
MACR	ACROLEIN + BUTADIENE13
CH3CHO	ALD2 + ALDX
BENZENE	BENZENE
CH4	CH4
CO	CO
C2H6	ETHA
C2H4	ETH
C2H5OH	ETOH
CH2O	FORM
ISOP	ISOP
CH3OH	MEOH
NH3	NH3
NO2	NO2
NO	NO
HONO	HONO
SO2	SO2
SULF	SULF
C10H16	TERP
TOLUENE	TOL
XYLENE	XYL
C3H6	OLE + PAR
BIGENE	OLE + 2 × PAR, IOLE + 2 × PAR
BIGALK	5 × PAR
C3H8	$1.12 \times 10^{-2} \times$ CO (Borbon et al., 2013)
CH3COCH3	$1.18 \times 10^{-2} \times$ CO (Borbon et al., 2013)
MVK	$2.40 \times 10^{-4} \times$ CO (Borbon et al., 2013)
C2H2	$5.87 \times 10^{-3} \times$ CO (Borbon et al., 2013)

Table S3. Emissions mapping for aerosol species. Each WRF-chem species listed below is actually 2 variables, for emissions into the Aitken and the accumulation size mode respectively. This is based on a modal aerosol description like e.g. in MADE (Ackermann et al., 1998). We here distribute the emissions input that is not size resolved into the different modes by applying a mass fraction of 0.1 for the Aitken mode and 0.9 for the accumulation mode (based on the work of Elleman and Covert, 2010). Emissions into these two modes are then distributed within WRF-Chem into the size bins of the MOSAIC aerosol module.

WRF-Chem species	**Emissions input species**
PM25	PAL + PCA + PFE + PK + PMFINE + PMG + PMN + PMOTHR + PSI + PTI
NA	PNA
CL	PCL
EC	PEC
ORG	POC
SO4	PSO4
NO3	PNO3
NH4	PNH4
PM_10	PMC

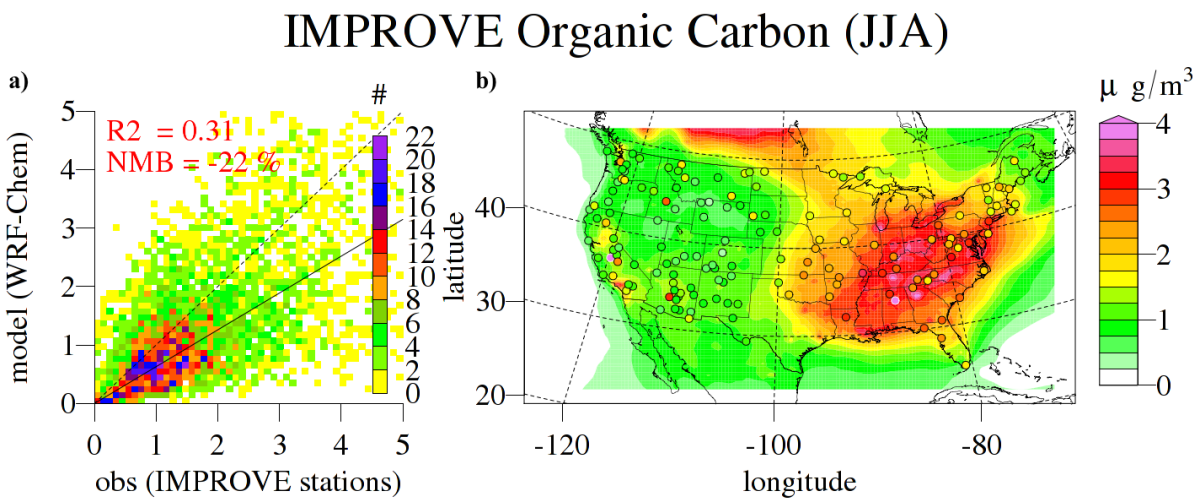

Figure S2. Like Figure 5 in the main text, but only using summer values (June, July, August).

Additional references

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