Species in MOZART-T1 with Stratosphere, Mesosphere and Lower Thermosphere (CESM2 TSLMT/WACCM mechanism)

Species	Chemical Formula	Description
ACBZO2	$C_7H_5O_3$	acylperoxy radical from benzaldehyde
ALKNIT	$C_5H_{11}ONO_2$	standard alkyl nitrate from BIGALK+OH chemistry
ALKO2	$C_5H_{11}O_2$	lumped alkane peroxy radical from BIGALK
ALKOOH	$C_5H_{12}O_2$	lumped alkane hydroperoxide
APIN	$C_{10}H_{16}$	alpha-pinene
AOA_NH	CO	age of air tracer
BCARY	$C_{15}H_{24}$	beta-caryophyllene and other sesquiterpenes
BENZENE	C_6H_6	benzene
BENZO2	$C_6H_7O_5$	bicyclic peroxy radical from OH + benzene
BENZOOH	$C_6H_8O_5$	bicyclic hydroperoxide from OH + benzene
BEPOMUC	$C_6H_6O_3$	unsaturated dialdehydic epoxide from OH + benzene
BIGALD1	$C_4H_4O_2$	butenedial, a product of aromatic oxidation
BIGALD2	$C_5H_6O_2$	4-oxo-2-pentenal, a product of aromatic oxidation
BIGALD3	$C_5H_6O_2$	2-methyl butenedial, a product of aromatic oxidation
BIGALD4	$C_6H_8O_2$	2-methyl-4-oxo-2-pentenal, a product of aromatic oxidation
BIGALD	$C_5H_6O_2$	lumped aldehyde from terpene ozonolysis
BIGALK	C_5H_{12}	lumped alkanes C>3
BIGENE	C_4H_8	lumped alkenes C>3
BPIN	$C_{10}H_{16}$	beta-pinene
BR	Br	bromine atom
BRCL	BrCl	bromine chloride
BRO	BrO	bromine monoxide
BRONO2	$BrONO_2$	bromine nitrate
BRY	Br_y	total reactive bromine
BZALD	C_7H_6O	benzaldehyde
BZOO	$C_7H_7O_2$	peroxy radical from toluene oxidation
BZOOH	$C_7H_8O_2$	hydroperoxide from toluene oxidation
C2H2	C_2H_2	ethyne (acetylene)
C2H4	C_2H_4	ethene
C2H5O2	$C_2H_5O_2$	ethylperoxy radical
C2H5OH	C_2H_5OH	ethanol
C2H5OOH	C_2H_5OOH	ethyl hydroperoxide
C2H6	C_2H_6	ethane
C3H6	C_3H_6	propene
C3H7O2	$C_3H_7O_2$	propylperoxy radical
C3H7OOH	C_3H_7OOH	propyl hydroperoxide
C3H8	C_3H_8	propane
C6H5O2	$C_6H_5O_2$	phenylperoxy radical
C6H5OOH	C_6H_5OOH	phenyl hydroperoxide
CCL4	CCl_4	carbon tetrachloride
CF2CLBR	CF_2ClBr	bromochlorodifluoromethane (Halon 1211)

CF3BR	CF_3Br	bromotrifluoromethane (Halon 1301)
CFC113	CCl_2FCClF_2	1,1,2-trichlorotrifluoroethane
CFC114	$CClF_2CClF_2$	1,2-dichloro-tetrafluoroethane
CFC115	$CClF_2CF_3$	chloropentafluoroethane
CFC11	$CFCl_3$	trichlorofluoromethane
CFC12	CF_2Cl_2	dichlorodifluoromethane
CH2BR2	CH_2Br_2	dibromomethane (methylene bromide)
CH2O	CH_2O	formaldehyde
CH3BR	CH_3Br	methyl bromide
CH3CCL3	CH3CCl3	mehtylchloroform
CH3CHO	CH_3CHO	acetaldehyde
CH3CL	CH_3Cl	methyl chloride
CH3CN	CH_3CN	acetonitrile
CH3CO3	CH_3CO_3	acetylperoxy radical
CH3COCH3	CH_3COCH_3	acetone
CH3COCHO	CH_3COCHO	methyl glyoxal
CH3COOH	CH_3COOH	acetic acid
CH3COOOH	CH_3COOOH	peracetic acid
CH3O2	CH_3O_2	methylperoxy radical
CH3OH	CH_3OH	methanol
CH3OOH	CH_3OOH	methyl hydroperoxide
CH4	CH_4	methane
CHBR3	$CHBr_3$	bromoform
CL2	Cl_2	chlorine
CL2O2	Cl_2O_2	chlorine monoxide dimer
CL	Cl	chlorine atom
CLO	ClO	chlorine monoxide
CLONO2	$ClONO_2$	chlorine nitrate
CLY	Cl_y	total reactive chlorine
CO2	CO_2	carbon dioxide
CO	CO	carbon monoxide
COF2	COF_2	carbonyl fluoride
COFCL	COFCl	carbonyl chlorofluoride
CRESOL	C_7H_8O	lumped cresols (hydroxymethylbenzenes)
DICARBO2	$C_5H_5O_4$	acylperoxy radical formed from aromatic oxidation, via unsaturated dicarbonyl chemistry
DMS	CH_3SCH_3	dimethyl sulfide
E90	CO	artificial tracer with 90-day lifetime
ENEO2	$C_4H_9O_3$	lumped hydroxyperoxy radical from OH + large alkenes
EO2	$HOCH_2CH_2O_2$	hydroxyperoxy radical from OH + ethene chemistry
EO	$HOCH_2CH_2O$	hydroxyalkoxy radical from OH + ethene chemistry
EOOH	$HOCH_2CH_2OOH$	hydroxyhydroperoxide from OH + ethene chemistry
F	F	fluorine atom
GLYALD	$HOCH_2CHO$	glycolaldehyde
GLYOXAL	$C_2H_2O_2$	glyoxal
H2402	$CBrF_2CBrF_2$	dibromotetrafluoroethane (Halon 2402)

H2	H_2	hydrogen
H2O2	H_2O_2	hydrogen peroxide
H2SO4	H_2SO_4	sulfuric acid
H	H	hydrogen atom
HBR	HBr	hydrogen bromide
HCFC141B	CH_3CCl_2F	1,1-dichoro-1-fluoroethane
HCFC142B	CH_3CClF_2	1-choro-1,1-difluoroethane
HCFC22	CHF_2Cl	chlorodifluoromethane
HCL	HCl	hydrogen chloride
HCN	HCN	hydrogen cyanide
HCOOH	HCOOH	formic acid
HF	HF	hydrogen fluoride
HMPROP	$C_4H_8O_2$	hydroxymethylpropanal, OH+MBO product
HMPROPO2	$C_4H_7O_4$	peroxy radical from HMPROP oxidation
HNO3	HNO_3	nitric acid
HO2	HO_2	hydroperoxyl radical
HO2NO2	HO_2NO_2	pernitric acid
HOBR	HOBr	hypobromous acid
HOCH2OO	$HOCH_2OO$	formaldehyde / HO2 adduct
HOCL	HOCl	hypochlorous acid
HONITR	$C_4H_9NO_4$	lumped hydroxynitrates from various compounds
HPALD	$C_5H_8O_3$	unsaturated hydroperoxyaldehyde, from isoprene chemistry
HYAC	CH_3COCH_2OH	hydroxyacetone
HYDRALD	$C_5H_8O_2$	lumped unsaturated hydroxycarbonyl
IEPOX	$C_5H_{10}O_3$	isoprene-derived epoxide
ISOP	C_5H_8	isoprene
ISOPAO2	$HOC_5H_8O_2$	1,2-isomer of isoprene peroxy radical
ISOPBO2	$HOC_5H_8O_2$	1,4-isomer of isoprene peroxy radical
ISOPNITA	$C_5H_9NO_4$	1,2-hydroxynitrate from OH+isoprene chemistry
ISOPNITB	$C_5H_9NO_4$	1,4-hydroxynitrate from OH+isoprene chemistry
ISOPNO3	$C_5H_8NO_5$	peroxy radical from isoprene NO3 oxidation
ISOPNOOH	$C_5H_9NO_5$	nitrooxy-hydroperoxide from NO3+isoprene chemistry
ISOPOOH	$C_5H_{10}O_3$	unsaturated hydroxyhydroperoxide
IVOC	$C_{13}H_{28}$	intermediate volatility organic precursor of VBS SOA
LIMON	$C_{10}H_{16}$	limonene
MACR	CH_2CCH_3CHO	methacrolein
MACRO2	$C_4H_7O_3$	peroxy radical from OH addition to methacrolein
MACROOH	$C_4H_8O_4$	peroxide from methacrolein
MALO2	$C_4H_3O_4$	acylperoxy radical from OH reaction with BIGALD1
MBO	$C_5H_{10}O$	2-methyl-3-buten-2-ol
MBONO3O2	$C_5H_{10}NO_6$	peroxy radical from NO3+MBO
MBOO2	$C_5H_{11}O_4$	peroxy radical from OH+MBO
MBOOOH	$C_5H_{12}O_4$	hydroperoxide from OH+MBO
MCO3	$CH_2CCH_3CO_3$	peroxy radical from OH abstraction reaction with MACR
MDIALO2	$C_4H_5O_4$	peroxy radical from OH addition to BIGALD1
MEK	C_4H_8O	methyl ethyl ketone

MEKO2	$C_4H_7O_3$	peroxy radical formed from MEK oxidation
MEKOOH	$C_4H_8O_3$	hydroperoxide from MEK oxidation
MPAN	$CH_2CCH_3CO_3NO_2$	methacryloyl peroxynitrate
MTERP	$C_{10}H_{16}$	lumped monoterpenes
MVK	$CH_2CHCOCH_3$	methyl vinyl ketone
MYRC	$C_{10}H_{16}$	limonene
N2D	N	electronically excited nitrogen atoms
N2O5	N_2O_5	dinitrogen pentoxide
N2O	N_2O	nitrous oxide
N2p	N_2	N2+
N	N	nitrogen atom
NC4CH2OH	$C_5H_9NO_4$	nitrooxy-alcohol from NO3+isoprene chemistry
NC4CHO	$C_5H_7NO_4$	nitrooxy-aldehyde from NO3+isoprene chemistry
NDEP	N	diagnostic of nitrogen deposition
NH3	NH_3	ammonia
NH4	NH_4	ammonium ion aerosol
NHDEP	N	diagnostic of ammonia deposition
NH_50	CO	idealized tracer with 50-day loss rate
NH_5	CO	idealized tracer with 5-day loss rate
NO2	NO_2	nitrogen dioxide
NO3	NO_3	nitrate radical
NO	NO	nitric oxide
NOA	$CH_3COCH_2ONO_2$	nitrooxyacetone, largely from NO3+propene chemistry
NOp	NO	NO+
NTERPO2	$C_{10}H_{16}NO_5$	peroxy radical from NO3+terpene chemistry
NTERPOOH	$C_{10}H_{17}NO_5$	nitrooxy-hydroperoxide from NO3+terpene chemistry
Np	N	N^+
O1D	O	excited state atomic oxygen
O2	O_2	oxygen
O2_1D	O_2	first excited state of O2 (Delta)
O2_1S	O_2	second excited state of O2 (Sigma)
O2p	O_2	O_2^+
O3	O_3	ozone
O3S	O_3	stratospheric ozone tracer
O	O	ground state atomic oxygen
OCLO	OClO	chlorine dioxide
OCS	OCS	carbonyl sulfide
OH	OH	hydroxyl radical
ONITR	$C_4H_7NO_4$	lumped hydroxynitrates (formula updated 2017-04-06)
Op	O	Op
PAN	$CH_3CO_3NO_2$	peroxy acetyl nitrate
PBZNIT	$C_7H_5O_3NO_2$	peroxy benzoyl nitrate
PHENO2	$C_6H_7O_6$	bicyclic peroxy radical from phenol
PHENO	C_6H_5O	phenoxy radical
PHENOL	C_6H_5OH	phenol, product of benzene chemistry
PHENOOH	$C_6H_8O_6$	bicyclic hydroperoxide from phenol

PO2	$C_3H_6OHO_2$	propene-derived peroxy radical
POOH	C_3H_6OHOOH	propene-derived hydroxy hydroperoxide
RO2	$CH_3COCH_2O_2$	peroxy radical from acetone
ROOH	CH_3COCH_2OOH	acetone hydroperoxide
S	S	atomic sulfur
SF6	SF_6	sulfur hexafluoride
SO2	SO_2	sulfur dioxide
SO3	SO_3	sulfur trioxide
SO	SO	sulfur monoxide
SOAG0	$C_{15}H_{38}O_2$	SOA gas-phase precursor VBS bin 0 (mol.wt. = 250 g/mol [Shrivastava et al., JGR, 2015])
SOAG1	$C_{15}H_{38}O_2$	SOA gas-phase precursor VBS bin 1
SOAG2	$C_{15}H_{38}O_2$	SOA gas-phase precursor VBS bin 2
SOAG3	$C_{15}H_{38}O_2$	SOA gas-phase precursor VBS bin 3
SOAG4	$C_{15}H_{38}O_2$	SOA gas-phase precursor VBS bin 4
ST80_25	CO	Stratospheric loss tracer
SVOC	$C_{22}H_{46}$	semi-volatile organic precursor of VBS SOA
TEPOMUC	$C_7H_8O_3$	toluene, xylenes product
TERP2O2	$C_{10}H_{15}O_4$	peroxy radical from lumped terpene product oxidation
TERP2OOH	$C_{10}H_{18}O_3$	hydroxy hydroperoxide from terpene 2 double bonds
TERPNIT	$C_{10}H_{17}NO_4$	mostly hydroxynitrates from OH+terpene chemistry
TERPO2	$C_{10}H_{17}O_3$	peroxy radical from terpenes+OH
TERPOOH	$C_{10}H_{18}O_3$	hydroxy hydroperoxide from terpene 0 double bonds
TERPROD1	$C_{10}H_{16}O_2$	lumped terpene oxidation product
TERPROD2	$C_9H_{14}O_2$	lumped terpene oxidation product (2^{nd} generation)
TOLO2	$C_7H_9O_5$	bicyclic peroxy radical from toluene
TOLOOH	$C_7H_{10}O_5$	bicyclic hydroperoxide from toluene
TOLUENE	C_7H_8	toluene
XO2	$C_5H_9O_5$	peroxy radical from ISOPOOH, IEPOX, HPALD
XOOH	$C_5H_{10}O_5$	lumped hydroperoxide from XO2 chemistry
XYLENES	C_8H_{10}	lumped xylenes
XYLENO2	$C_8H_{11}O_5$	bicyclic peroxy radical from OH+xylenes chemistry
XYLENOOH	$C_8H_{12}O_5$	bicyclic hydroperoxide from OH+xylenes chemistry
XYLOL	$C_8H_{10}O$	dimethyl phenol from xylenes oxidation
XYLOLO2	$C_8H_{11}O_6$	bicyclic peroxy radical from OH+XYLOL chemistry
XYLOLOOH	$C_8H_{12}O_6$	bicyclic hydroperoxide from OH+XYLOL chemistry

Aerosols

NH4	NH_4	ammonium bulk aerosol
bc_a1	C	black carbon, MAM accumulation mode
bc_a4	C	black carbon, MAM primary carbon mode
dst_a1	$AlSiO_5$	dust, MAM accumulation mode
dst_a2	$AlSiO_5$	dust, MAM Aitken mode
dst_a3	$AlSiO_5$	dust, MAM coarse mode
ncl_a1	NaCl	sea salt, MAM accumulation mode
ncl_a2	NaCl	sea salt, MAM Aitken mode

ncl_a3	NaCl	sea salt, MAM coarse mode
num_a1	H	aerosol number concentration, MAM accumulation mode
num_a2	H	aerosol number concentration, MAM Aitken mode
num_a3	H	aerosol number concentration, MAM coarse mode
num_a4	H	aerosol number concentration, MAM primary carbon mode
pom_a1	C	primary organic matter, MAM accumulation mode
pom_a4	C	primary organic matter, MAM primary carbon mode
so4_a1	NH_4HSO_4	sulfate aerosol, MAM accumulation mode
so4_a2	NH_4HSO_4	sulfate aerosol, MAM Aitken mode
so4_a3	NH_4HSO_4	sulfate aerosol, MAM coarse mode
soa1_a1	$C_{15}H_{38}O_2$	SOA bin 1, MAM accumulation mode
soa1_a2	$C_{15}H_{38}O_2$	SOA bin 1, MAM Aitken mode
soa2_a1	$C_{15}H_{38}O_2$	SOA bin 2, MAM accumulation mode
soa2_a2	$C_{15}H_{38}O_2$	SOA bin 2, MAM Aitken mode
soa3_a1	$C_{15}H_{38}O_2$	SOA bin 3, MAM accumulation mode
soa3_a2	$C_{15}H_{38}O_2$	SOA bin 3, MAM Aitken mode
soa4_a1	$C_{15}H_{38}O_2$	SOA bin 4, MAM accumulation mode
soa4_a2	$C_{15}H_{38}O_2$	SOA bin 4, MAM Aitken mode
soa5_a1	$C_{15}H_{38}O_2$	SOA bin 5, MAM accumulation mode
soa5_a2	$C_{15}H_{38}O_2$	SOA bin 5, MAM Aitken mode

Species with dry deposition:
ALKNIT, ALKOOH, BENZOOH, BZOOH, C2H5OH, C2H5OOH, C3H7OOH, C6H5OOH, CH2O, CH3CHO, CH3CN, CH3COCH3, CH3COCHO, CH3COOH, CH3COOOH, CH3OH, CH3OOH, CO, EOOH, GLYALD, H2O2, H2SO4, HCN, HCOOH, HNO3, HO2NO2, HONITR, HPALD, HYAC, HYDRALD, IEPOX, ISOPNITA, ISOPNITB, ISOPNO3, ISOPNOOH, ISOPOOH, IVOC, MACROOH, MEKOOH, MPAN, NC4CH2OH, NC4CHO, NH3, NH4, NO, NO2, NOA, NTERPOOH, O3, ONITR, PAN, PHENOOH, POOH, ROOH, SO2, SOAG0, SOAG1, SOAG2, SOAG3, SOAG4, SVOC, TERP2OOH, TERPNIT, TERPOOH, TERPROD1, TERPROD2, TOLOOH, XOOH, XYLENOOH, XYLOLOOH, bc_a1, bc_a4, dst_a1, dst_a2, dst_a3, ncl_a1, ncl_a2, ncl_a3, num_a1, num_a2, num_a3, num_a4, pom_a1, pom_a4, so4_a1, so4_a2, so4_a3, soa1_a1, soa1_a2, soa2_a1, soa2_a2, soa3_a1, soa3_a2, soa4_a1, soa4_a2, soa5_a1, soa5_a2

Species with wet deposition:
ALKNIT, ALKOOH, BENZOOH, BRONO2, BZOOH, C2H5OH, C2H5OOH, C3H7OOH, C6H5OOH, CH2O, CH3CHO, CH3CN, CH3COCHO, CH3COOH, CH3COOOH, CH3OH, CH3OOH, CLONO2, COF2, COFCL, EOOH, GLYALD, H2O2, H2SO4, HBR, HCL, HCN, HCOOH, HF, HNO3, HO2NO2, HOBR, HOCL, HONITR, HPALD, HYAC, HYDRALD, IEPOX, ISOPNITA, ISOPNITB, ISOPNO3, ISOPNOOH, ISOPOOH, IVOC, MACR, MACROOH, MEKOOH, MVK, NC4CH2OH, NC4CHO, NDEP, NH3, NH4, NHDEP, NOA, NTERPOOH, ONITR, PHENOOH, POOH, ROOH, SO2, SOAG0, SOAG1, SOAG2, SOAG3, SOAG4, SVOC, TERP2OOH, TERPNIT, TERPOOH, TERPROD1, TERPROD2, TOLOOH, XOOH, XYLENOOH, XYLOLOOH,

bc_a1, bc_a4, dst_a1, dst_a2, dst_a3, ncl_a1, ncl_a2, ncl_a3, num_a1, num_a2, num_a3, num_a4, pom_a1, pom_a4, so4_a1, so4_a2, so4_a3, soa1_a1, soa1_a2, soa2_a1, soa2_a2, soa3_a1, soa3_a2, soa4_a1, soa4_a2, soa5_a1, soa5_a2