Corrections to "Exploring DMS oxidation and implications for global aerosol radiative forcing"

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Table 3. The three DMS oxidation reactions in the standard CAM6-chem.

Gas-phase Reactions	**Rate Constants*** **(cm^3 $molecule^{-1}$ s^{-1})**	**References**
$DMS + OH \rightarrow SO_2$ (H-abstraction)	$9.60 \times 10^{-12} \exp(-234/T)$	(Emmons et al., 2010)
$DMS + OH \rightarrow 0.5SO_2 + 0.5HO_2$ (OH-addition)	$1.7 \times 10^{-42} \exp(7810/T) \times 0.21[M] / \{1 + 5.5 \times 10^{-31} \exp(7460/T) \times 0.21[M]\}$	(Emmons et al., 2010)
$DMS + NO_3 \rightarrow SO_2 + HNO_3$	$1.90 \times 10^{-13} \exp(520/T)$	(Emmons et al., 2010)

* T is air temperature in K; [M] is air density in molecules cm^{-3}.

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Table 4. Summary of the MSA-producing branch of the H-abstraction pathway in the DMS chemistry implemented into CAM6-chem.

Gas-phase Reactions	**Rate Constants*** **(cm^3 $molecule^{-1}$ s^{-1})**	**References**
$DMS + OH \rightarrow MSP\ (CH_3SCH_2OO)$	$1.12 \times 10^{-11} \exp(-250/T)$	(Saunders et al., 2003)
$DMS + Cl \rightarrow 0.45MSP + 0.55(CH_3)_2S(Cl) + 0.45HCl$	3.40×10^{-10}	IUPAC
$(CH_3)_2S(Cl) \rightarrow DMS + Cl$	9.00×10^{1}	(Enami et al., 2004)
$MSP + NO \rightarrow CH_3SCH_2(O) + NO_2$	$4.90 \times 10^{-12} \exp(260/T)$	(Saunders et al., 2003)
$MSP + RO_2 \rightarrow CH_3SCH_2(O) + O_2$	3.74×10^{-12}	(Saunders et al., 2003)
$CH_3SCH_2(O) \rightarrow CH_3S + CH_2O$	1.00×10^{6}	(Saunders et al., 2003)
$CH_3S + O_3 \rightarrow CH_3S(O) + O_2$	$1.15 \times 10^{-12} \exp(430/T)$	(Saunders et al., 2003)
$CH_3S + O_2 \rightarrow CH_3S(OO)$	$1.20 \times 10^{-16} \exp(1580/T)$	(Saunders et al., 2003)
$CH_3S(O) + O_3 \rightarrow CH_3(O_2) + SO_2$	4.00×10^{-13}	(Saunders et al., 2003)
$CH_3S(OO) \rightarrow CH_3(O_2) + SO_2$	$5.60 \times 10^{16} \exp(-10870/T)$	(Saunders et al., 2003)
$CH_3S(OO) \rightarrow CH_3SO_2$	1.00	(Saunders et al., 2003)
$CH_3SO_2 + O_3 \rightarrow CH_3SO_3 + O_2$	3.00×10^{-13}	(Saunders et al., 2003)
$CH_3SO_2 \rightarrow CH_3(O_2) + SO_2$	$5.00 \times 10^{13} \exp(-9673/T)$	(Saunders et al., 2003)
$CH_3SO_3 + HO_2 \rightarrow MSA + O_2$	5.00×10^{-11}	(Saunders et al., 2003)
$CH_3SO_3 \rightarrow CH_3(O_2) + H_2SO_4$	$5.00 \times 10^{13} \exp(-9946/T)$	(Saunders et al., 2003)

* T is air temperature in K.

Table 5. Summary of the isomerization branch of the H-abstraction pathway in the DMS chemistry implemented into CAM6-chem.

Gas-phase Reactions	**Rate Constants*** **(cm^3 $molecule^{-1}$ s^{-1})**	**References**
MSP → $OOCH_2SCH_2OOH$	$2.24 \times 10^{11} \exp(-9.8 \times 10^3/T) \exp(1.03 \times 10^8/T^3)$	(Veres et al., 2020)
$OOCH_2SCH_2OOH$ → HPMTF ($HOOCH_2SCHO$) + OH	$6.09 \times 10^{11} \exp(-9.5 \times 10^3/T) \exp(1.1 \times 10^8/T^3)$	(Veres et al., 2020)
$OOCH_2SCH_2OOH + NO \rightarrow HOOCH_2SCH_2O + NO_2$	$4.90 \times 10^{-12} \exp(260/T)$	(Saunders et al., 2003)
$HOOCH_2SCH_2O \rightarrow HOOCH_2S + CH_2O$	1.00×10^6	(Saunders et al., 2003)
$OOCH_2SCH_2OOH + HO_2 \rightarrow HOOCH_2SCH_2OOH + O_2$	$1.13 \times 10^{-13} \exp(1300/T)$	(Saunders et al., 2003)
$HPMTF + OH \rightarrow HOOCH_2SCO + H_2O$	1.11×10^{-11}	(Patroescu et al., 1996; Vermeuel et al., 2020)
$HOOCH_2SCO \rightarrow HOOCH_2S + CO$	$9.20 \times 10^9 \exp(-505.4/T)$	(Wu et al., 2015)
$HOOCH_2SCO \rightarrow OH + CH_2O + OCS$	$1.60 \times 10^7 \exp(-1468.6/T)$	(Wu et al., 2015)
$HOOCH_2S + O_3 \rightarrow HOOCH_2SO + O_2$	$1.15 \times 10^{-12} \exp(430/T)$	(Saunders et al., 2003)
$HOOCH_2S + NO_2 \rightarrow HOOCH_2SO + NO$	$6.00 \times 10^{-11} \exp(240/T)$	(Saunders et al., 2003)
$HOOCH_2SO + O_3 \rightarrow SO_2 + CH_2O + OH + O_2$	4.00×10^{-13}	(Saunders et al., 2003)
$HOOCH_2SO + NO_2 \rightarrow SO_2 + CH_2O + OH + NO$	1.20×10^{-11}	(Saunders et al., 2003)

* T is air temperature in K.

Table 6. Gas-phase DMS oxidation (OH-addition pathway) implemented into CAM6-chem in this study.

Gas-phase Reactions	**Rate Constants[*] (cm^3 $molecule^{-1}$ s^{-1})**	**References**
$DMS + OH \rightarrow 0.6SO_2 + 0.4DMSO + CH_3O_2$	$8.20 \times 10^{-39}[O_2] \exp(5376/T) / \{1 + 1.05 \times 10^{-5}([O_2]/[M]) \exp(3644/T)\}$	(Burkholder et al., 2015; Pham et al., 1995)
$DMS + NO_3 \rightarrow SO_2 + HNO_3 + CH_3O_2 + CH_2O$	$1.13 \times 10^{-12} \exp(530/T)$	(Burkholder et al., 2015)
$DMS + BrO \rightarrow DMSO + Br$	$3.39 \times 10^{-13} \exp(950/T)$	(Burkholder et al., 2015)
$DMS + O_3 \rightarrow SO_2$	1.00×10^{-19}	(Burkholder et al., 2015)
$DMS + Cl \rightarrow 0.5SO_2 + 0.5DMSO + 0.5HCl + 0.5ClO$	3.40×10^{-10}	(Burkholder et al., 2015; Chen et al., 2018)
$DMSO + OH \rightarrow 0.95MSIA + 0.05SO_2$	$8.94 \times 10^{-11} \exp(800/T)$	(Burkholder et al., 2015)
$MSIA + OH \rightarrow 0.9SO_2 + 0.1MSA$	9.00×10^{-11}	(Burkholder et al., 2015)
$MSIA + O_3 \rightarrow MSA$	2.00×10^{-18}	(Lucas, 2002)

[*] T is air temperature in K; [M] and $[O_2]$ are density of air and O_2 in molecules cm^{-3}, respectively.

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