Bimolecular reactions	cm^3 molecule^{-1} s^{-1}	Reference
$IO + HO_2 \rightarrow HOI + O_2$	$1.4 \times 10^{-11} e^{(540/T)}$	(IUPAC, 2006)
$I + HO_2 \rightarrow HI + O_2$	$1.5 \times 10^{-11} e^{(-1090/T)}$	(IUPAC, 2006)
$OH + HI \rightarrow I + H_2O$	3.0×10^{-11}	(Mossinger and Cox, 2001)
$IO + NO \rightarrow I + NO_2$	$9.1 \times 10^{-12} e^{(240/T)}$	(Mossinger and Cox, 2001)
$I + O_3 \rightarrow IO + O_2$	$2.3 \times 10^{-11} e^{(-870/T)}$	(Mossinger and Cox, 2001)
$HOI + OH \rightarrow IO + H_2O$	2.0×10^{-13}	(Mossinger and Cox, 2001)
$IO + IO \rightarrow I + OIO$	$5.4 \times 10^{-11} e^{(180/T)} \times 0.38$	(IUPAC, 2006)
$IO + IO \rightarrow I_2O_2$	$5.4 \times 10^{-11} e^{(180/T)} \times 0.62$	(IUPAC, 2006)
$I + NO_3 \rightarrow IO + NO_2$	4.5×10^{-10}	(Chambers et al., 1992)
$I_2 + NO_3 = I + IONO_2$	1.5×10^{-12}	(IUPAC, 2006)
$IO + OIO \rightarrow I_2O_3$	2.0×10^{-10}	(Mossinger and Cox, 2001)
$OIO + OIO \rightarrow I_2O_4$	5.0×10^{-11}	(Mossinger and Cox, 2001)
$OIO + OH \rightarrow HOIO_2$	$2.2 \times 10^{-10} e^{(243/T)}$	(Plane et al., 2006)
$OIO + NO \rightarrow NO_2 + IO$	$1.1 \times 10^{-12} e^{(542/T)}$	(Plane et al., 2006)
$BrO + HO_2 \rightarrow HOBr + O_2$	$4.5 \times 10^{-12} e^{(460/T)}$	(IUPAC, 2006)
$Br + HO_2 \rightarrow HBr + O_2$	$1.5 \times 10^{-11} e^{(-600/T)}$	(Mossinger and Cox, 2001)
$Br + O_3 \rightarrow BrO + O_2$	$1.7 \times 10^{-11} e^{(-800/T)}$	(Mossinger and Cox, 2001)
$Br + HCHO \rightarrow HBr + HCO$	$7.7 \times 10^{-13} e^{(-580/T)}$	(Mossinger and Cox, 2001)
$Br + CH_3CHO \rightarrow HBr + CH_3CO$	$1.8 \times 10^{-12} e^{(-460/T)}$	(Mossinger and Cox,

		2001)
$BrO + OH \rightarrow HO_2 + Br$	$1.7 \times 10^{-11} e^{(250/T)}$	(Mossinger and Cox, 2001)
$BrO + BrO \rightarrow Br + Br + O_2$	$2.4 \times 10^{-12} e^{(40/T)}$	(Mossinger and Cox, 2001)
$BrO + BrO \rightarrow Br_2 + O_2$	$2.8 \times 10^{-14} e^{(860/T)}$	(Mossinger and Cox, 2001)
$BrO + NO \rightarrow NO_2 + Br$	$8.8 \times 10^{-12} e^{(260/T)}$	(Mossinger and Cox, 2001)
$HBr + OH \rightarrow H_2O + Br$	$5.5 \times 10^{-12} e^{(200/T)}$	(Mossinger and Cox, 2001)
$BrO + IO \rightarrow Br + I + O_2$	$2.5 \times 10^{-11} e^{(260/T)} \times 0.3$	(Mossinger and Cox, 2001)
$BrO + IO \rightarrow Br + OIO$	$2.5 \times 10^{-11} e^{(260/T)} \times 0.7$	(Mossinger and Cox, 2001)
$BrO + O \rightarrow Br + O_2$	$1.9 \times 10^{-11} e^{(230/T)}$	(Mossinger and Cox, 2001)
$HOBr + O \rightarrow OH + BrO$	$1.2 \times 10^{-10} e^{(-430/T)}$	(Mossinger and Cox, 2001)
$BrNO_3 + Br \rightarrow Br_2 + NO_3$	4.9×10^{-11}	(Orlando and Tyndall, 1996)
$BrNO_3 + NO \rightarrow BrNO + NO_3$	3.0×10^{-19}	(Orlando and Tyndall, 1996)
$BrNO_3 + BrNO \rightarrow Br_2 + NO_2 + NO_2$	1.0×10^{-16}	(Orlando and Tyndall, 1996)

Termolecular reactions	$n = \{1 + \log_{10}(k_0 \times [M]/k_\infty))^2\}^{-1}$ $k = ((k_0[M]/(1+k_0[M]/k_\infty)) \times F_c^n$ $F_c = 0.6$ unless stated otherwise	Reference
$Br + NO_2 \rightarrow BrNO_2$	$k_0 = 4.2 \times 10^{-31} (T/300)^{-2.4}$ $k_\infty = 1.8 \times 10^{-11}$ $F_c = 0.4$	(IUPAC, 2006)
$BrO + NO_2 \rightarrow BrNO_3$	$k_0 = 4.7 \times 10^{-31} (T/300)^{-3.1}$ $k_\infty = 6.9 \times 10^{-12} (T/300)^{-2.9}$	(IUPAC, 2006)
$I + NO_2 \rightarrow INO_2$	$k_0 = 3.0 \times 10^{-31} (T/300)^{-1.0}$ $k_\infty = 6.6 \times 10^{-11}$	(IUPAC, 2006)
$I + NO \rightarrow INO$	$k_0 = 1.8 \times 10^{-32} (T/300)^{-1.0}$ $k_\infty = 1.7 \times 10^{-11}$	(IUPAC, 2006)
$IO + NO_2 \rightarrow IONO_2$	$k_0 = 7.7 \times 10^{-31} (T/300)^{-5}$	(IUPAC,

	$k_\infty = 1.6 \times 10^{-11}$ $F_c = 0.4$	2006)

Thermal decomposition	s^{-1}	Reference
$IONO_2 \rightarrow IO + NO_2$	$1.1 \times 10^{15} e^{(-12060/T)}$	(IUPAC, 2006)
$BrONO_2 \rightarrow BrO + NO_2$	$2.8 \times 10^{13} e^{(-12360/T)}$	(Orlando and Tyndall, 1996)

Photolysis rates	Reference for absorption cross section and quantum yield	
$BrO \rightarrow Br + O$		(IUPAC, 2006)
$HOBr \rightarrow Br + OH$		(IUPAC, 2006)
$BrNO_3 \rightarrow BrO + NO_2$		(IUPAC, 2006)
$BrNO_3 \rightarrow Br + NO_3$		(IUPAC, 2006)
$BrNO_2 \rightarrow Br + NO_2$		(IUPAC, 2006)
$HOI \rightarrow OH + I$		(Sander et al., 2006)
$IO \rightarrow I + O$		(Sander et al., 2006)
$OIO \rightarrow I + O_2$		(Sander et al., 2006)

Uptake coefficient to aerosol	γ	Reference
HOI	0.061	(Mossinger and Cox, 2001)
OIO	1	(Saiz-Lopez et al., 2008)
HI	0.02	(Saiz-Lopez et al., 2008)
INO_2	0.02	(Saiz-Lopez et al., 2008)
$IONO_2$	0.02	(Saiz-Lopez et al., 2008)
I_2O_5	0.02	(Saiz-Lopez et al., 2008)
HOBr	0.061	(Mossinger and Cox, 2001)
HBr	0.02	(Saiz-Lopez et al., 2008)
$BrNO_3$	0.02	(Saiz-Lopez et al., 2008)

Chambers, R. M., Heard, A. C., and Wayne, R. P.: Inorganic Gas-Phase Reactions of the Nitrate Radical - I_2+NO_3 and I+NO_3, Journal of Physical Chemistry, 96, 3321-3331, 1992.

IUPAC: http://www.iupac-kinetic.ch.cam.ac.uk/, 2006.

Mossinger, J. C., and Cox, R. A.: Heterogeneous reaction of HOI with sodium halide salts, Journal of Physical Chemistry A, 105, 5165-5177, 2001.

Orlando, J. J., and Tyndall, G. S.: Rate coefficients for the thermal decomposition of $BrONO_2$ and the heat of formation of $BrONO_2$, Journal of Physical Chemistry, 100, 19398-19405, 1996.

Plane, J. M. C., Joseph, D. M., Allan, B. J., Ashworth, S. H., and Francisco, J. S.: An experimental and theoretical study of the reactions OIO + NO and OH + OH, Journal of Physical Chemistry A, 110, 93-100, 2006.

Saiz-Lopez, A., Plane, J. M. C., Mahajan, A. S., Anderson, P. S., Bauguitte, S. J. B., Jones, A. E., Roscoe, H. K., Salmon, R. A., Bloss, W. J., Lee, J. D., and Heard, D. E.: On the vertical distribution of boundary layer halogens over coastal Antarctica: implications for O_3, HO_x, NO_x and the Hg lifetime, Atmospheric Chemistry and Physics, 8, 887-900, 2008.

Sander, S. P., Friedl, R. R., Ravishankara, A. R., Golden, D. M., Kolb, C. E., Kurylo, M. J., Molina, M. J., Moortgat, G. K., Finlayson-Pitts, B. J., Wine, P. H., Huie, R. E., and Orkin, V. L.: Chemical kinetics and photochemical data for use in atmospheric studies Evaluation number 15, JPL-NASA 06-2, 2006.