ADDITIONS AND CORRECTIONS

2005, Volume 109A

Liang Chu and Cort Anastasio*: Formation of Hydroxyl Radical from the Photolysis of Frozen Hydrogen Peroxide

Page 6269. There was an error in the original version of Figure 5, where the scales of the *x*-axes (wavelength) in the top two panels did not match the scale of the bottom panel. This is corrected in the new version shown below. The figure caption, and its discussion in the text, are correct and remain unchanged.

Page 6270. There were a few mistakes in the original calculations of the rate constants and rates of •OH formation in Table 2. Most importantly, our originally reported values for Alert, Nunavut were based on an incorrect temperature (268 K instead of the new, and more typical, value of 243 K) and an actinic flux for the wrong day. Correcting for these errors, the new rate constants (and rates) of •OH formation from photolysis of HOOH and NO_3^- are 2.1 and 9.8 times lower, respectively, than the original values. There were also some minor mistakes in the modeled actinic fluxes at the other three sites. Fixing these problems changes the originally reported rate constants and rates for •OH formation by −34% to +30%. The correct values are shown in the table below. Despite these errors, the conclusions of the original paper are unchanged.

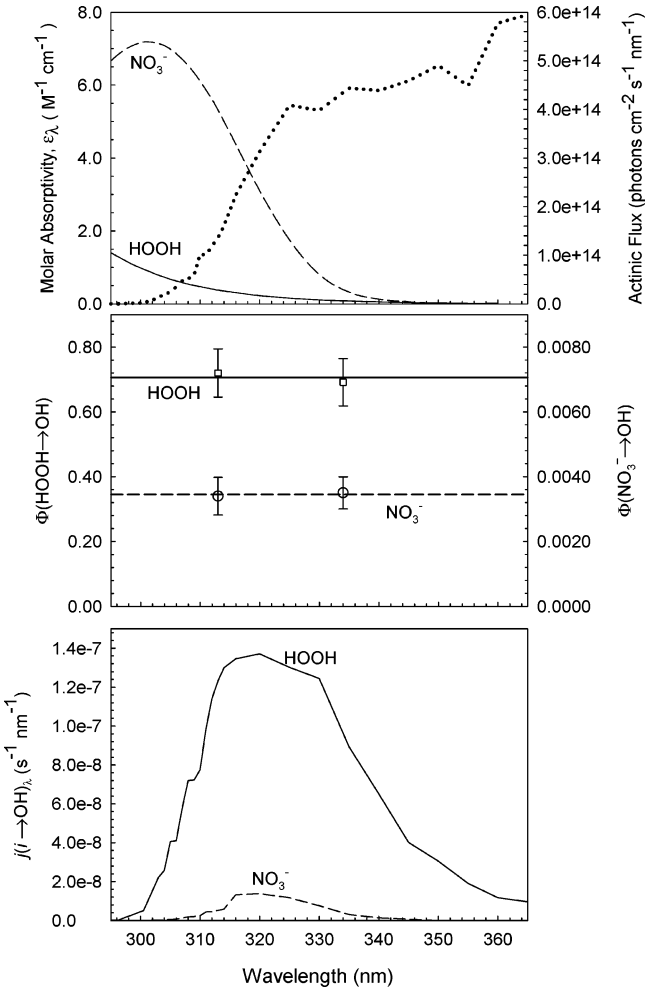

Figure 5. Action spectra for •OH formation from the photolysis of HOOH and NO_3^- on ice. The top panel shows molar absorptivities of aqueous hydrogen peroxide (solid line) and nitrate (dashed line) at 274 K as well as the modeled midday, actinic flux on the summer solstice at Neumayer, Antarctica (70.7 °S, 8.3 °W; dotted line; ref 52). The middle panel shows quantum yields of •OH from the photolysis of HOOH (squares; this work) and nitrate (circles; ref 10) in ice pellets at 263 K. Symbols show data for pellets illuminated with 313 and 334 nm radiation, and the lines represent the recommended quantum yields at 263 K for each chromophore at $\lambda > 290$ nm. The bottom panel shows the wavelength dependence of the rate constants for •OH formation from photolysis of HOOH (solid line) and nitrate (dashed line). The area under each curve is the total rate constant for •OH formation from that chromophore ($j(i\rightarrow$•OH)) at Neumayer under the conditions described above.

TABLE 2: Calculated Rates of Formation of •OH from the Photolysis of Snowpack Hydrogen Peroxide and Nitrate at Sites in the Arctic and Antarctic

		typical surface snowpack concn of chromophore i (μM)[c]		rate constant for •OH formation, $j(i\rightarrow{}^{\bullet}OH)_{SUN}$ (10^{-6} s^{-1})[d]		rate of •OH formation, $R(i\rightarrow{}^{\bullet}OH)_{SUN}$ (10^{-12} M s^{-1})		fraction of OH
location[a]	date[b]	HOOH	NO_3^-	HOOH	NO_3^-	HOOH	NO_3^-	from HOOH
Alert, Nunavut	Mar 21	6	4.2	0.27	0.0060	1.6	0.025	0.98
Summit, Greenland	Jun 21	18	4	4.3	0.22	77	0.87	0.99
South Pole	Dec 21	10	1.6	1.9	0.068	19	0.11	0.99
Neumayer, Antarctic	Dec 21	4.8	1.4	4.8	0.28	23	0.39	0.98

[a] atitudes and longitudes of sampling sites: Alert (82.5 °N, 62.3 °W), Summit (72.6 °N, 38.5 °W), South Pole (90 °S), and Neumayer (70.7 °S, 8.3 °W). [b] Calculations are for midday (solar noon) on the specified date. Temperatures used for calculations at Alert, Summit, South Pole, and Neumayer were 243, 263, 253, and 268 K, respectively. [c] Values are from Anastasio and Jordan[8] (estimated HOOH) and Toom-Sauntry and Barrie[46] for Alert, Hutterli et al.[7] and Dibb et al.[47]for Summit, Wolff et al.[48] for South Pole. At Neumayer, we used an average of the typical 0−5 mm values of Jacob and Klockow[49] (6.0 μM) and that of Riedel[50] (3.5 μM) for HOOH and the average value of Mulvaney et al.[51] (1.9 μM) and Wolff et al.[48] (0.8 μM) for NO_3^-. [d] The actinic fluxes used in our calculations are from the NCAR TUV model[52] using a wavelength-independent albedo of 0.93 for the snow surface[53] and ozone columns of 306−309 Dobson units.[54] Altitudes used for Alert, Summit, South Pole and Neumayer were 63, 3200, 2800, and 45 m, respectively.

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