Table S1. Raw CCl_2FCCl_2F (CFC-112) UV Absorption Cross Section Data (Uncorrected for CFC-112a impurity) (10^{-20} cm^2 $molecule^{-1}$, base e) Obtained in This Work.

λ (nm)	323 K	296 K	270 K	250 K	230 K
192.5	130.3 ± 1.6	127.1 ± 2.4	127.7 ± 0.9	129.1 ± 1.3	127.4 ± 4.0
195	99.0 ± 1.1	95.0 ± 1.4	94.7 ± 1.1	92.3 ± 0.3	89.9 ± 0.8
200	51.6 ± 0.7	48.0 ± 0.7	46.3 ± 0.5	44.5 ± 0.2	42.3 ± 0.5
205	24.3 ± 0.2	22.7 ± 0.1	21.0 ± 0.3	19.5 ± 0.07	18.6 ± 0.6
210	11.5 ± 0.07	10.4 ± 0.2	9.45 ± 0.06	8.80 ± 0.01	8.17 ± 0.3
215	5.69 ± 0.08	5.14 ± 0.03	4.79 ± 0.03	4.42 ± 0.3	4.05 ± 0.2
220	2.92 ± 0.02	2.73 ± 0.02	2.57 ± 0.05	2.33 ± 0.19	
225	1.72 ± 0.03	1.62 ± 0.02	1.46 ± 0.01	1.42 ± 0.09	
230	1.16 ± 0.03	1.11 ± 0.01	1.01 ±0.01	0.99 ± 0.01	
235	0.80 ± 0.01	0.77 ± 0.01	0.68 ± 0.01	0.70 ± 0.03	

* Quoted uncertainties are 2σ fit precision values (rounded off).

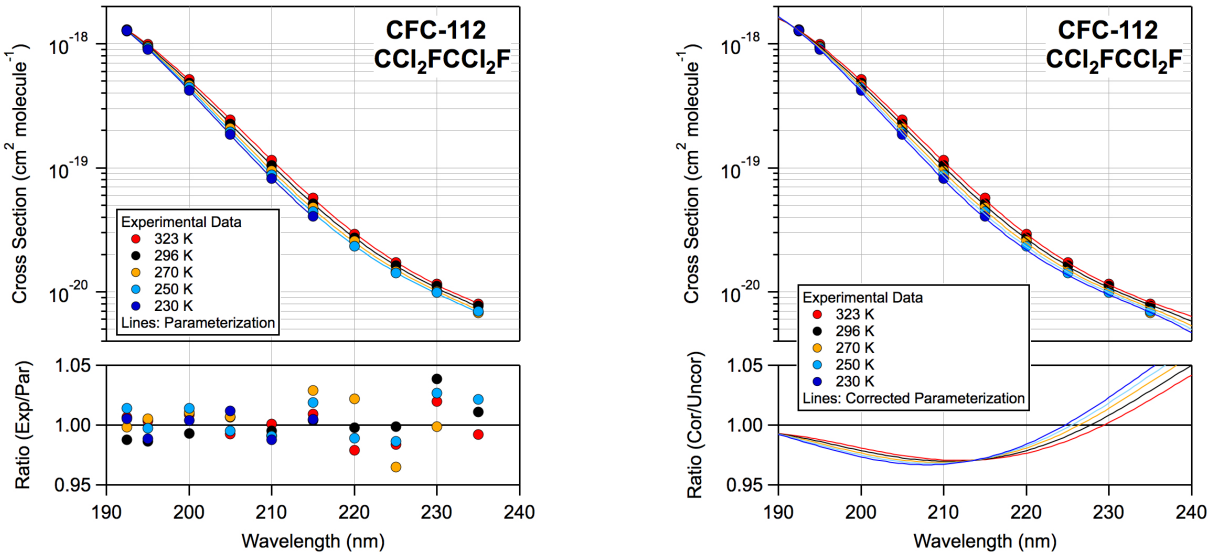

Figure S1. CCl_2FCCl_2F (CFC-112) UV absorption spectrum (base e) and parameterization obtained in this work. Left panel: Raw cross section data (symbols, Table S1) and the parameterization of the data using equation 2 (see text). The lower frame shows the overall quality of the parameterization. Right panel: Raw cross section data and the parameterization after accounting for the CCl_3CClF_2 (CFC-112a) impurity (parameters given in Table 3). The lower frame shows the magnitude of the correction and its wavelength dependence.

Table S2. Raw CCl_3CClF_2 (CFC-112a) UV Absorption Cross Section Data (Uncorrected for CFC-112 impurity) (10^{-20} cm^2 $molecule^{-1}$, base e) Obtained in This Work.

λ (nm)	323 K	296 K	270 K	250 K	230 K
192.5	149.8 ± 9	151.2 ± 6	151.6 ± 4	157.7 ± 3	161.0 ± 15
195	122.1 ± 2.6	124.0 ± 3.0	124.5 ± 1.7	127.6 ± 0.5	123.5 ± 1.3
200	75.4 ± 1.1	74.6 ± 1.2	75.7 ± 0.9	75.1 ± 1.3	73.1 ± 5.7
205	43.6 ± 0.2	42.2 ± 0.5	50.0 ± 0.4	40.0 ± 0.2	38.8 ± 0.6
210	22.4 ± 0.8	20.8 ± 0.9	19.8 ± 0.8	18.6 ± 0.6	17.5 ± 0.3
215	10.7 ± 0.05	9.57 ± 0.03	8.64 ± 0.04	8.13 ± 0.2	7.33 ± 0.25
220	5.01 ± 0.10	4.19 ± 0.01	3.68 ± 0.01	3.34 ± 0.1	3.25 ± 0.02
225	2.20 ± 0.013	1.80 ± 0.01	1.52 ± 0.01	1.36 ± 0.02	
230	0.950 ± 0.017	0.767 ± 0.012	0.617 ± 0.01	0.568 ± 0.012	
235	0.415 ± 0.014	0.317 ± 0.012	0.251 ± 0.004		

* Quoted uncertainties are 2σ fit precision values (rounded off).

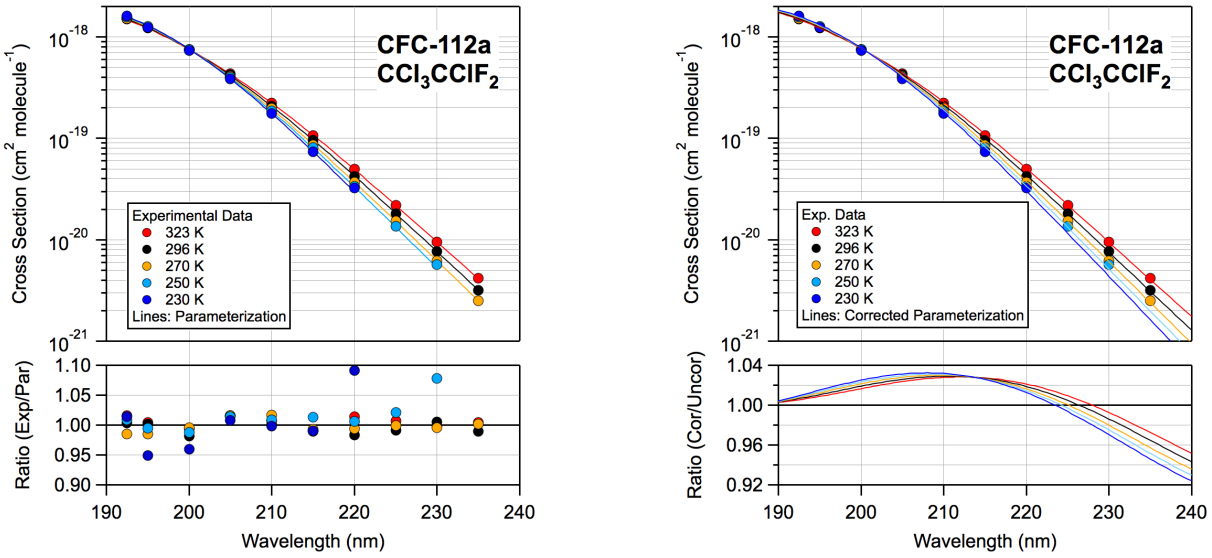

Figure S2. CCl_3CClF_2 (CFC-112a) UV absorption spectrum (base e) and parameterization obtained in this work. Left panel: Raw cross section data (symbols, Table S2) and the parameterization of the data using equation 2 (see text). The lower frame shows the overall quality of the parameterization. Right panel: Raw cross section data and the parameterization after accounting for the CCl_2FCCl_2F (CFC-112) impurity (parameters given in Table 3). The lower frame shows the magnitude of the correction and its wavelength dependence.

Table S3. Infrared integrated band strengths for CCl_2FCCl_2F (CFC-112), CCl_3CClF_2 (CFC-112a), CCl_3CF_3 (CFC-113a), and CCl_2FCF_3 (CFC-114a) obtained in this work and comparison with literature values.

Molecule		Integrated band strength (10^{-17} cm^2 molecule^{-1} cm^{-1}, base e)		
		Olliff and Fischer[a]	Etminan et al.[b,c]	This Work
CCl_2FCCl_2F	CFC-112	2.75 (1063–1225)		2.73 (1063–1225)
		0.84 (995–1063)		0.75 (995–1063)
		4.71 (810–973)		5.15 (810–973)
		2.35 (725–810)		2.48 (725–810)
		0.02 (612–645)		0.017 (612–645)
		0.04 (463–498)		–
		10.7 (Total)		**11.2** (Total)
CCl_3CClF_2	CFC-112a	3.34 (1150-1215)		3.59 (1150-1215)
		1.81 (985-1056)		1.92 (985-1056)
		2.92 (812-922)		2.99 (812-922)
		2.34 (723-812)		2.45 (723-812)
		0.15 (610-650)		0.18 (610-650)
		10.6 (Total)		**11.4** (Total)
CCl_3CF_3	CFC-113a	0.158 (525–590)	0.497 (703–725)	0.19 (525–590)
		0.512 (690–750)	4.3 (840–920)	0.59 (690–750)
		3.55 (825–880)	8.76 (1180–1290)	3.99 (825–880)
		0.544 (880–945)	**13.6** Total)	0.60 (880–945)
		5.19 (1200–1238)		5.68 (1200–1238)
		2.95 (1238–1290)		3.23 (1238–1290)
		12.9 (Total)		**14.7** (Total)
CCl_2FCF_3	CFC-114a	1.85 (1266–1355)		2.00 (1266–1355)
		5.50 (1206-1266)		6.23 (1206-1266)
		0.50 (1160-1206)		0.435 (1160-1206)
		1.96 (1070-1160)		2.08 (1070-1160)
		0.23 (1024-1070)		0.185 (1024-1070)
		4.47 (861-955)		4.85 (861-955)
		0.21 (822-861)		0.168 (822-861)
		0.52 (713-756)		0.582 (713-756)
		0.05 (575-603)		0.060 (575-603)
		0.07 (543-575)		0.086 (543-575)
		15.4 (Total)		**16.9** (Total)

[a] Taken from Olliff and Fischer (1994). [b] Taken from Etminan et al. (2014). [c] Etminan et al. (2014) report band strengths for a CFC-112 and CFC-112a mixed sample, but do not report values for the individual isomers.

Etminan, M., E.J. Highwood, J.C. Laube, R. McPheat, G. Marston, K.P. Shine, and K.M. Smith (2014), Infrared absorption spectra, radiative efficiencies, and global warming potentials of newly-detected halogenated compounds: CFC-113a, CFC-112 and HCFC-133a, *Atmosphere*, *5*, 473-483, doi:10.3390/atmos5030473.

Olliff, M.P., and G. Fischer (1994), Integrated absorption intensities of haloethanes and halopropanes, *Spectrochimica Acta Part a-Molecular and Biomolecular Spectroscopy*, *50*, 2223-2237, doi:10.1016/0584-8539(93)e0027-t.

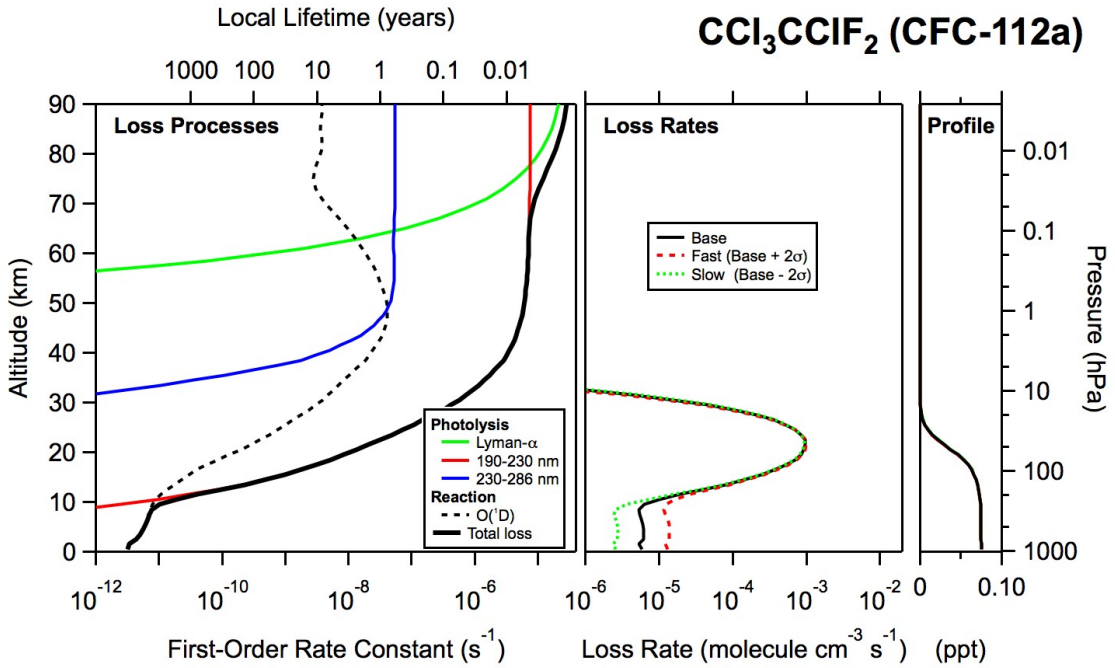

Figure S3. Global annually averaged vertical profiles of the atmospheric loss processes, molecular loss rates, and mixing ratio for CCl_3CClF_2 (CFC-112a) calculated using the GSFC 2-D atmospheric model for year 2010. The model calculations were performed using the CFC-112a UV absorption spectrum from this work and other model input parameters taken from the literature as described in the text. The global annually averaged lifetime for CFC-112a was calculated to be 51.5 (50.0–52.6) years.

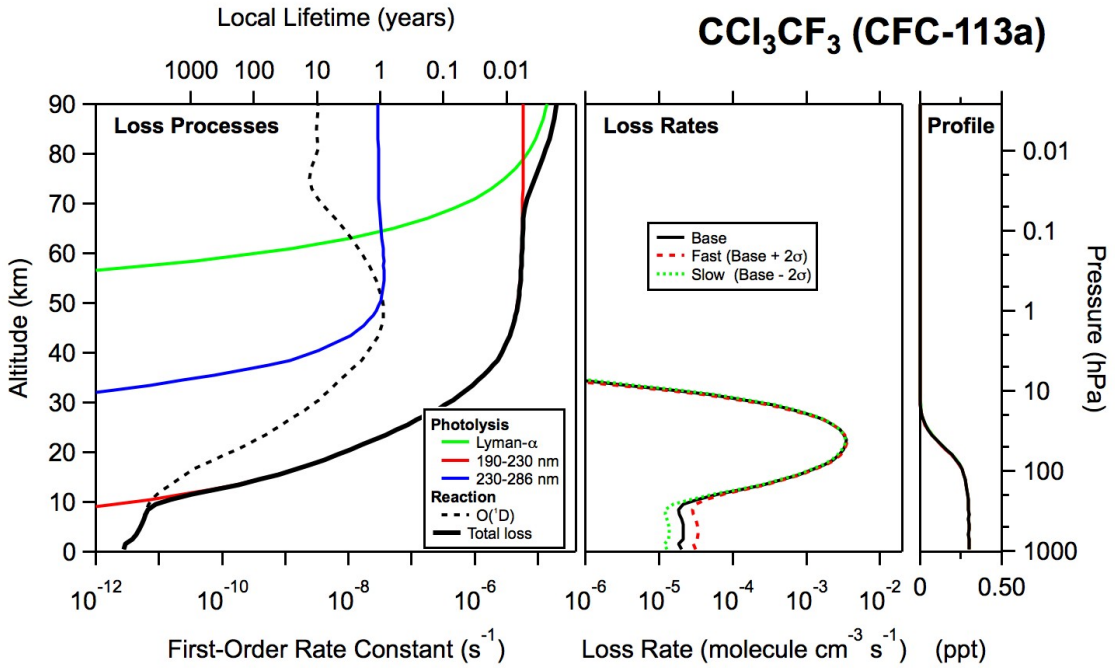

Figure S4. Global annually averaged vertical profiles of the atmospheric loss processes, molecular loss rates, and mixing ratio for CCl_3CF_3 (CFC-113a) calculated using the GSFC 2-D atmospheric model for year 2010. The model calculations were performed using the CFC-113a UV absorption spectrum from this work and other model input parameters taken from the literature as described in the text. The global annually averaged lifetime for CFC-113a was calculated to be 55.4 (54.3–56.3) years.

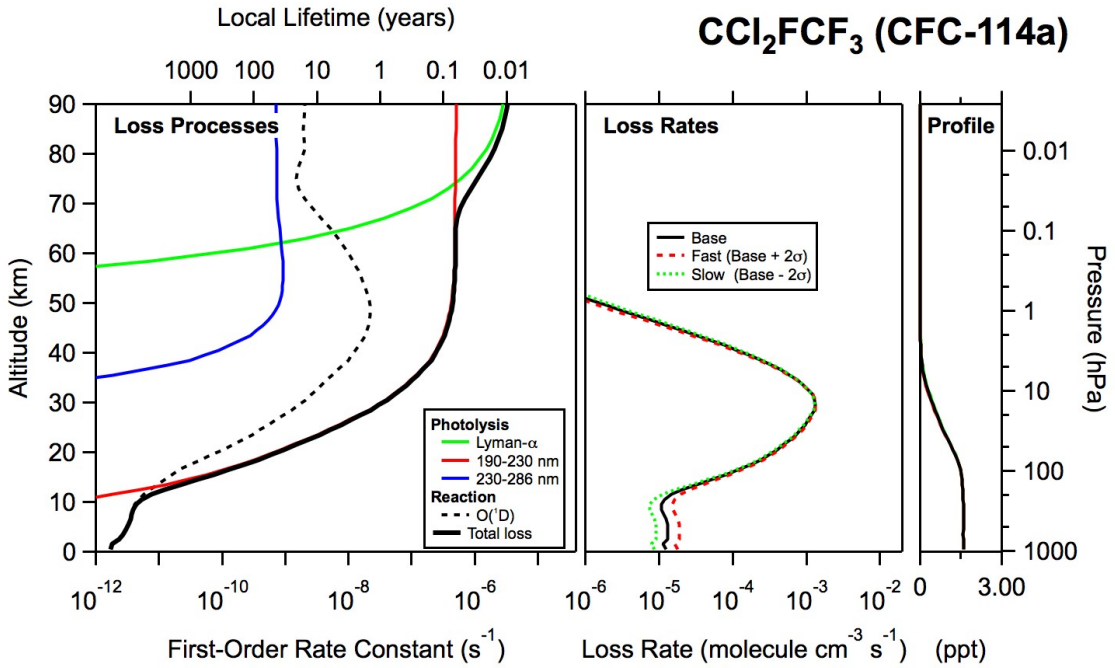

Figure S5. Global annually averaged vertical profiles of the atmospheric loss processes, molecular loss rates, and mixing ratio for CCl_2FCF_3 (CFC-114a) calculated using the GSFC 2-D atmospheric model for year 2010. The model calculations were performed using the CFC-114a UV absorption spectrum from this work and other model input parameters taken from the literature as described in the text. The global annually averaged lifetime for CFC-114a was calculated to be 105.3 (102.9–107.4) years.