

Supplement of Atmos. Meas. Tech., 9, 115–132, 2016
<http://www.atmos-meas-tech.net/9/115/2016/>
doi:10.5194/amt-9-115-2016-supplement
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Supplement of

Sensitivity of thermal infrared nadir instruments to the chemical and microphysical properties of UTLS secondary sulfate aerosols

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Table 1: Dependence of the extinction at 1170 cm^{-1} on the temperature: N=number of data points (different temperatures), T_{max} =maximum available temperature [K], T_{min} =minimum available temperature [K], Δ =difference between the extinction coefficient at T_{min} and T_{max} [%].

H2SO4	N	T_{max}	T_{min}	Background	Volcanic
				Δ	Δ
80	1	293	293	—	—
75	2	293	193	+11.0%	+10.2%
70	4	293	233	+8.0%	+7.9%
64	6	293	188	+8.3%	+7.8%
60	5	293	213	-4.2%	-3.9%
57	8	293	188	+20.1%	+20.0%
50	5	293	215	-4.7%	-4.8%
45	6	293	203	+2.6%	+1.7%
40	4	293	213	-9.5%	-9.2%
30	8	293	193	-8.6%	-7.0%
20	5	293	233	-8.7%	-8.8%
10	6	293	253	-9.8%	-8.9%
0	4	293	253	-0.3%	-1.3%

Table 2: Dependence of the relative extinction $1170\text{-}800\text{ cm}^{-1}$ on the temperature: N=number of data points (different temperatures), T_{max} =maximum available temperature [K], T_{min} =minimum available temperature [K], Δ =difference between the extinction coefficient at T_{min} and T_{max} [%].

H2SO4	N	T_{max}	T_{min}	Background	Volcanic
				Δ	Δ
80	1	293	293	—	—
75	2	293	193	-1.2%	-3.2%
70	4	293	233	-1.3%	-2.8%
64	6	293	188	+4.1%	+5.1%
60	5	293	213	-8.2%	-9.7%
57	8	293	188	+8.0%	+8.3%
50	5	293	215	+2.9%	+4.2%
45	6	293	203	-2.2%	-3.9%
40	4	293	213	-8.8%	-9.8%
30	8	293	193	-7.2%	-8.1%
20	5	293	233	-3.2%	-4.7%
10	6	293	253	-2.6%	-3.8%
0	4	293	253	-0.1%	-0.3%

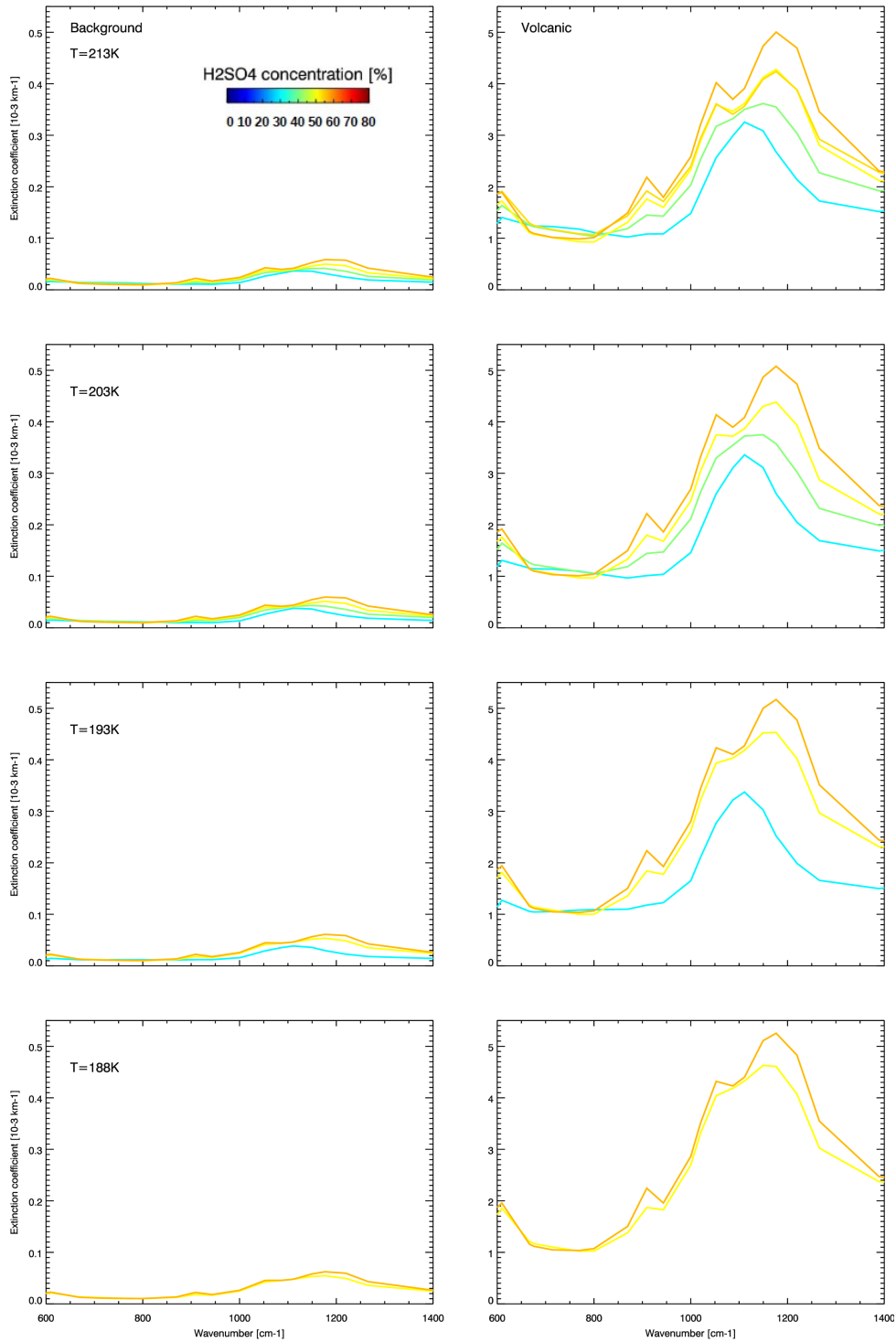


Figure 1: Spectral extinction coefficients for sulphate aerosol layers with different H₂SO₄ mixing ratios, from 0 to 80 % as indicated by the colorbar, and different temperatures, from 188 to 213 K as reported in the individual sub-figures. Different mixing ratio/temperature combinations are shown, depending on the availability in the refractive indices dataset of Biermann et al. (2000). The extinction coefficients are shown for a typical background size distribution (left column) and for a moderate volcanically perturbed size distribution (right column). See the manuscript for further details.

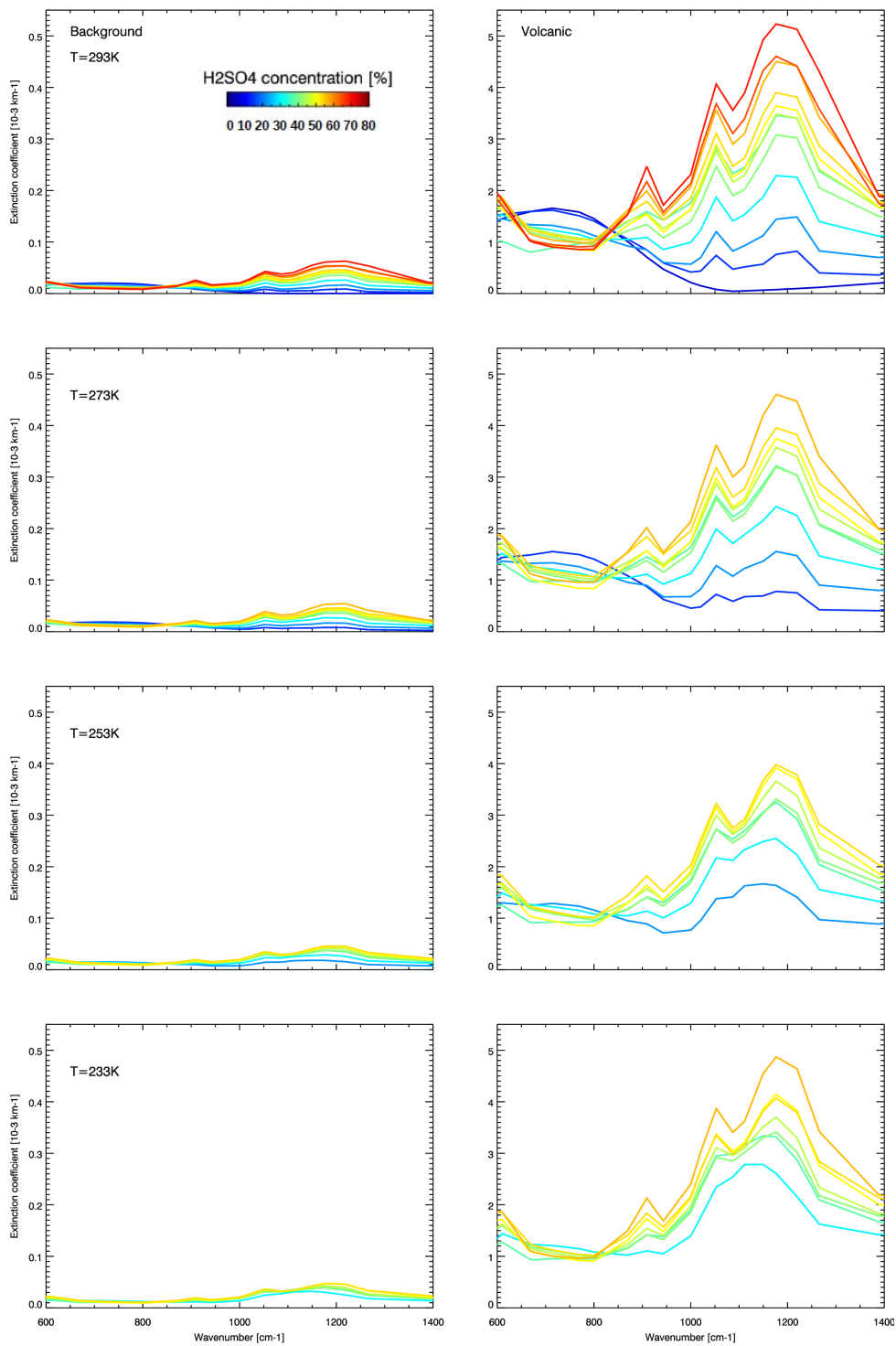


Figure 2: Same as Figure 1 but for temperatures from 233 to 293 K.