Atmospheric
Chemistry
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# *Corrigendum to*
# "Observations of the spectral dependence of linear particle depolarization ratio of aerosols using NASA Langley airborne High Spectral Resolution Lidar" published in Atmos. Chem. Phys., 15, 13453–13473, 2015

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Subsequent to the publication of the above-mentioned paper, a coding error was uncovered and corrected, which affects the 355 nm linear particle depolarization ratios for the three case studies. Corrections are provided for Table 1 and Figs. 5, 8, 9, 14, and 15 below. The effect is larger than the quoted systematic errors but does not affect the discussion of the spectral dependence of the linear particle depolarization ratio.

**Table 1.** Measured properties for specific dust and smoke samples. To obtain these values, samples were taken at specific times and altitudes comprising 400–4500 distinct measurement points. For the dust cases, values were chosen near the peak value of the 532 nm particle depolarization ratio, where it can be inferred that the aerosol is nearly pure dust. The values are reported as mean ± standard deviation for the sample. Systematic uncertainties for particle depolarization ratio from HSRL-2 are indicated in parentheses.

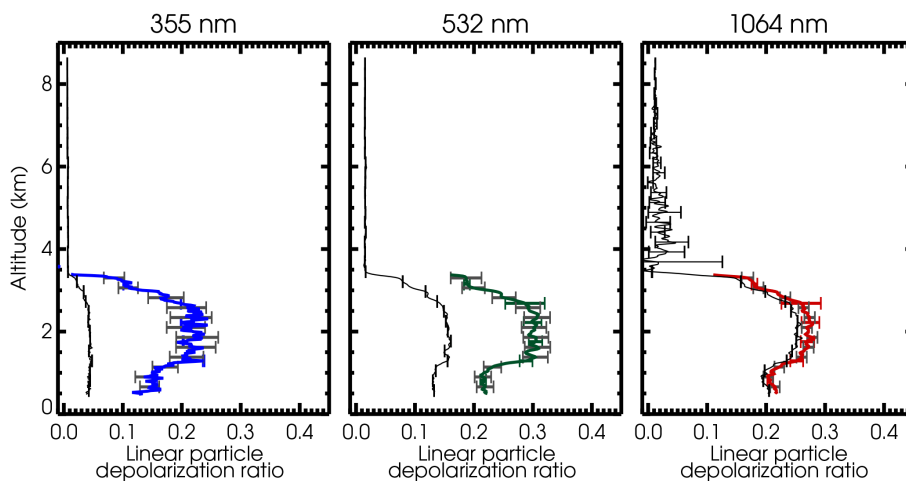| | | Layer AOD (532 nm) | Linear particle depolarization ratio (1064 nm) | Linear particle depolarization ratio (532 nm) | Linear particle depolarization ratio (355 nm) (HSRL-2 only) | Aerosol backscatter Ångström exponent (532/1064) |
|---|---|---|---|---|---|---|
| Midwest US 13 July 2014 | transported Saharan dust | 0.10 | $0.270 \pm 0.005(0.009)$ | $0.304 \pm 0.005(0.022)$ | $0.209 \pm 0.015(0.033)$ | $0.46 \pm 0.03$ |
| Caribbean 18 August 2010 | transported Saharan dust | 0. 25 | $0.278 \pm 0.012$ | $0.327 \pm 0.018$ | – | $0.68 \pm 0.13$ |
| Chihuahuan desert 8 February 2013 | local North American dust | 0.02 | $0.383 \pm 0.006(0.011)$ | $0.373 \pm 0.014(0.024)$ | $0.225 \pm 0.041(0.034)$ | $-0.07 \pm 0.04$ |
| Pico de Orizaba 12 March 2006 | local North American dust | 0.31 | $0.400 \pm 0.009$ | $0.334 \pm 0.018$ | – | $-0.9 \pm 0.4$ |
| Denver 17 July 2014 | smoke | 0.05 | $0.018 \pm 0.002(0.007)$ | $0.093 \pm 0.015(0.011)$ | $0.203 \pm 0.036(0.017)$ | $1.1 \pm 0.1$ |
| East Coast US 2 August 2007 | smoke | 0.06 | $0.019 \pm 0.005$ | $0.068 \pm 0.010$ | – | $0.62 \pm 0.25$ |



**Figure 5.** Line plots illustrating the volume and aerosol linear depolarization ratio profile for the HSRL-2 measurements at 17:12 UT (17.2 UT) on 13 July 2014. The volume depolarization ratio is shown as a thin black line. The error bars on the volume depolarization ratio represent random error (most are small and mostly obscured except 1064 nm). The particle depolarization ratio is shown as a thick colored line. Colored error bars indicate random error (most are small enough to be obscured by the line) while gray error bars indicate systematic uncertainty, estimated as described in the text. Systematic uncertainty is not shown for the volume depolarization ratio; see text for estimate. The vertical resolution of these measurements is 30 m and the horizontal resolution is 10 s for all wavelengths.
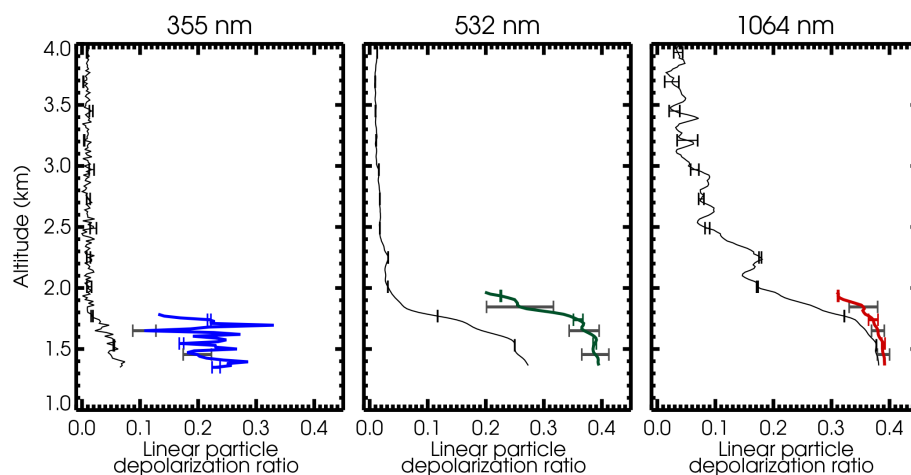
**Figure 8.** Line plots illustrating the volume and aerosol linear depolarization ratio profile for the HSRL-2 measurements at 17:08 UT (17.14 UT) on 8 February 2013. Error bars and resolutions as described for Fig. 5.
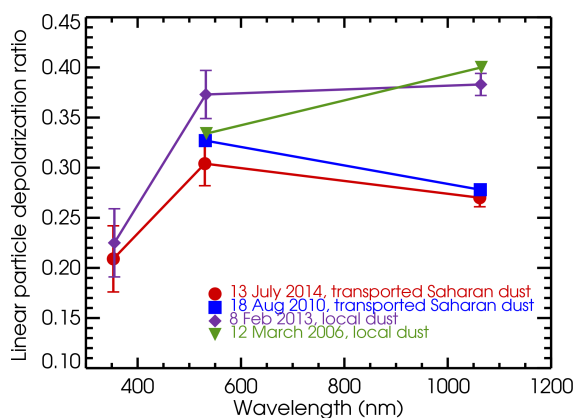


**Figure 9.** Linear particle depolarization ratio measured by HSRL-2 and HSRL-1 for the four dust cases discussed in the text. Note that the spectral dependence (and in particular the 1064 nm channel) is different for the two local dust-dominated aerosol cases compared to the transported Saharan dust-dominated aerosol cases.
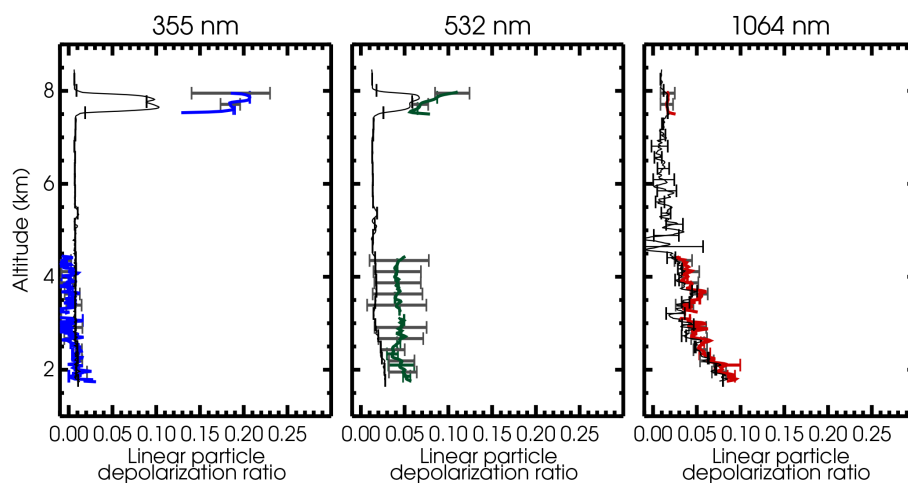
**Figure 14.** Line plots illustrating the volume and aerosol linear depolarization ratio profile for the HSRL-2 measurements at 19:18 UT (19.3 UT) on 17 July 2014. Error bars and resolutions as described for Fig. 5.
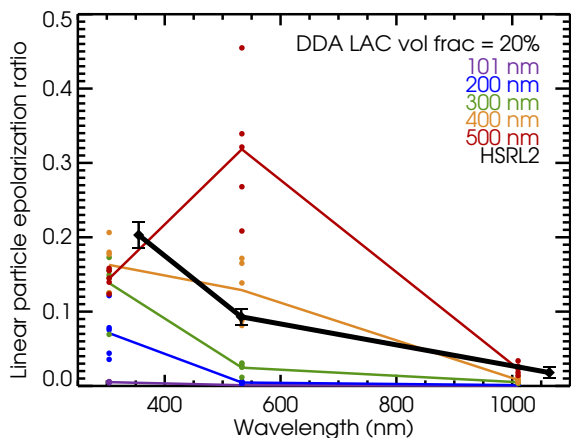


**Figure 15.** Linear particle depolarization ratio at three wavelengths for soot aggregates embedded in a sulfate shell reproduced from Kahnert et al. (2012), for 20 % LAC volume fraction. Dots indicate five realizations with randomly generated geometries, per aggregate volume-equivalent particle radius, and the colored lines connect the averages of the five for each wavelength. The legend shows the aggregate volume-equivalent particle radii at which the calculation was performed. The thick black line indicates the particle depolarization ratios measured by airborne HSRL-2 within a smoke plume observed on 17 July 2014 at 355, 532, and 1064 nm.