

## Analysis of High-Altitude Aerosol from Asia to Mauna Loa

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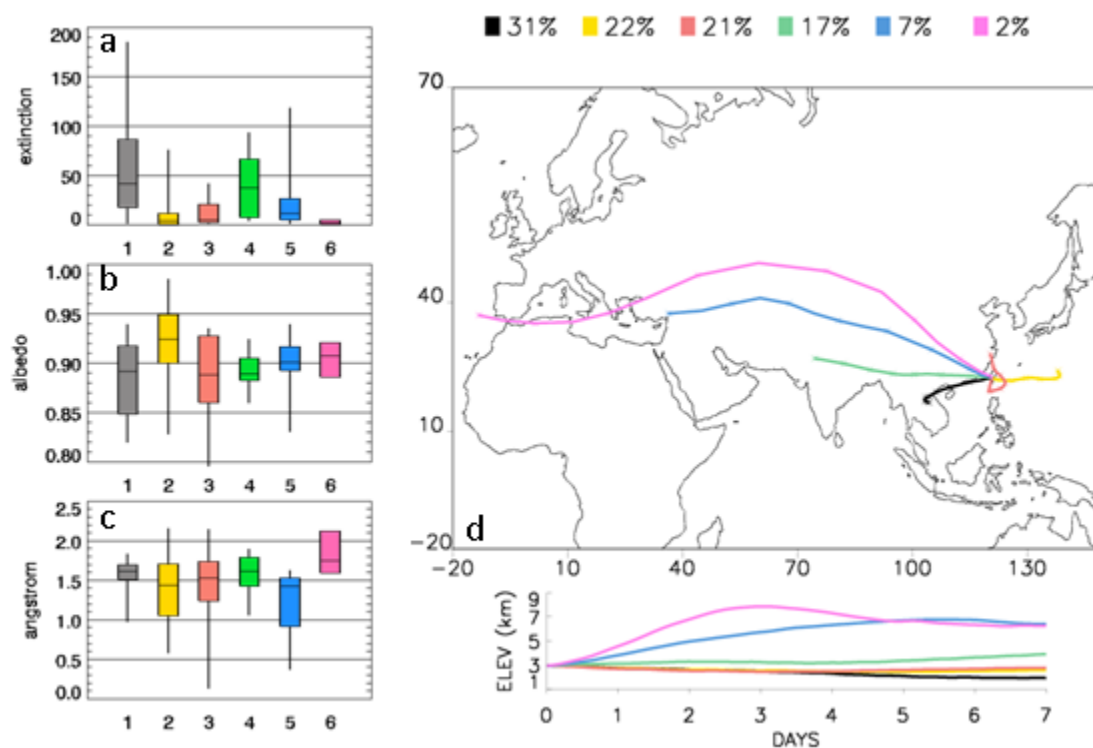
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High-altitude mountaintop observatories provide the opportunity to make long-term, continuous measurements of aerosol properties in the free troposphere without the added expense and difficulty of operating aircraft. Here we present an analysis of aerosol optical property measurements from three mountaintop sites in Asia (Pyramid, Nepal; Waliguan, China; and Lulin Mountain, Taiwan) and compare the results with aerosol measurements at Mauna Loa, Hawaii. The seasonal variation and systematic relationships among aerosol properties change from site to site but the timing and links among parameters can be related to aerosol sources known to impact the individual sites. We focus on differentiating air masses based on their combined aerosol properties (Figure 1). Specifically we use data clustering techniques to identify different air mass types at these four sites and to determine if the resulting clusters can be related to specific aerosol events (e.g., dust, smoke). This allows us to determine the contribution of aerosol events to the aerosol climatology at these locations and to propose site-specific rules for identifying aerosol type. Furthermore, these rules could help constrain both model parameterizations and remote sensing algorithms which are often based on an assumed aerosol type.



**Figure 1.** Aerosol extinction (a), single scattering albedo (b) and Ångström exponent (c) as a function of trajectory (d) for Lulin Mountain. Colors indicate which back trajectory the aerosol properties are associated with.