

Variation in aerosol optical properties and the sources of aerosols at Buddha's Birthplace, Lumbini, Nepal

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Aerosol optical properties were measured over Lumbini, Nepal with CIMEL sunphotometer of the Aerosol Robotic Network (AERONET) program. Lumbini, located in the northern edge of the central Indo-Gangetic Plains (IGP), is a sacred place- the birthplace of Lord Buddha and a UNESCO world heritage site. Average aerosol optical depth (AOD) was found to be 0.64±0.38 (0.06-3.28) during the sampling period (January 2013 -December 2014), with highest seasonal AOD during post-monsoon season (0.72±0.44). More than 84% of the daily averaged AOD values, during the monitoring period, were above 0.3. Based on the relationship between AOD and Angstrom exponent, urban/industrial and biomass burning, and mixed aerosols were found to be the most prevalent aerosol volume size distribution was bi-modal during all four seasons with modes centered at 0.1-0.3 μ m and 3-4 μ m. For both fine and coarse modes, the highest volumetric concentration of ~0.08 μ m⁻³ μ m⁻² was observed during post-monsoon and pre-monsoon seasons. As revealed by the single scattering albedo (SSA), asymmetry parameter (AP) and refractive index (RI) analyses, Lumbini is dominated by urban-industrial and biomass burning aerosols.



3. Relationship between Angstrom exponent and **AOD showing aerosols from multiple sources**

Mixed, urban/industrial and biomass burning aerosols are most prevalent. Contributions of anthropogenic aerosols were found to be higher. Most of the air masses reaching Lumbini traversed across IGP region.

Fellowship for International PhD Students. The authors acknowledge C. Cüppers and M. Pahlke of the Lumbini International Research Institute (LIRI) for providing the space and power to run the instruments at the LIRI premises; Bhogendra Kathayat and Bhoj Raj Bhatta for their support in operation of the site.