



Concentrations, size distributions and temporal variations of fluorescent biological aerosol particles in southern tropical India

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Biological aerosols constitute a wide range of dead and alive biological materials and structures that are suspended in the atmosphere. They play an important role in the atmospheric physical, chemical and biological processes and health of living being by spread of diseases among humans, plants, and, animals. The atmospheric abundance, sources, physical properties of PBAPs as compared to non-biological aerosols, however, is poorly characterized. The Indian tropical region, where large fraction of the world's total population is residing, experiences a distinctive meteorological phenomenon by means of Indian Summer Monsoon (IMS). Thus, the properties and characteristics of biological aerosols are also expected to be very diverse over the Indian subcontinent depending upon the seasons. Here we characterize the number concentration and size distribution of Fluorescent Biological Aerosol Particles (FBAP) at a high altitude continental site, Munnar (10.09 N, 77.06 E; 1605 m asl) in South India during the South-West monsoon, which constitute around 80 percent of the annual rainfall in Munnar.

Continuous three months measurements (from 01 June 2014 to 21 Aug 2104) FBAPs were carried out at Munnar using Ultra Violet Aerodynamic Particle Sizer (UVAPS) during IMS. The mean number and mass concentration of coarse FBAP averaged over the entire campaign was $1.7 \times 10^{-2} \text{ cm}^{-3}$ and $0.24 \mu\text{g m}^{-3}$ respectively, which corresponds to 2 percent and 6 percent of total aerosol particle number and mass concentration. In agreement to other previous measurements the number size distribution of FBAP also peaks at 3.2 micron indicating the strong presence of fungal spores. This was also supported by the Scanning Electron Microscopic analysis of bioaerosols on filter paper. They also displayed a strong diurnal cycle with maximum concentration occurring at early morning hours.

During periods of heavy and continuous rain where the wind is consistently blowing from South-West direction it was observed that the FBAP concentrations were very low. This may be due to the clean marine influx coming over the Indian Ocean and due to continuous wash out during the rain. While in case of sporadic rain events with fluctuating wind direction, high FBAP concentration was noticed. However such a similar trend was not observed for total aerosol particle concentration. The detailed results will be presented.