



Number size distribution measurements of biological aerosols under contrasting environments and seasons from 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. Though omnipresent, their concentration and composition exhibit large spatial and temporal variations depending up on their sources, land-use, and local meteorology. The Indian tropical region, which constitutes approximately 18% of the world's total population exhibits vast geographical extend and experiences a distinctive meteorological phenomenon by means of Indian Summer Monsoon (IMS). Thus, the sources, properties and characteristics of biological aerosols are also expected to have significant variations over the Indian subcontinent depending upon the location and seasons.

Here we present the number concentration and size distribution of Fluorescent Biological Aerosol Particles (FBAP) from two contrasting locations in Southern tropical India measured during contrasting seasons using Ultra Violet Aerodynamic Particle Sizer (UV-APS). Measurements were carried out at a pristine high altitude continental site, Munnar (10.09 N, 77.06 E; 1605 m asl) during two contrasting seasons, South-West Monsoon (June-August, 2014) and winter (Jan – Feb, 2015) and in Chennai, a coastal urban area, during July – November 2015.

FBAP concentrations at both the locations showed large variability with higher concentrations occurring at Chennai. Apart from regional variations, the FBAP concentrations also exhibited variations over two different seasons under the same environmental condition. In Munnar the FBAP concentration increased by a factor of four from South-West Monsoon to winter season. The average size distribution of FBAP at both the locations exhibited varied peaks in the size range of 1-3 μm indicating different sources of biological particles. In Chennai the number size distribution was observed to be bimodal with peaks at 2.5 μm and 1.1 μm . whereas in Munnar the number size distribution was monomodal during monsoon with a prominent peak at 3 μm and was bimodal during winter with peaks at 1.5 μm and 2.8 μm . The detailed analysis also revealed the distinct features and trends in the diurnal patterns of FBAP at contrasting locations during distinct seasons. The further details about the measurements will be presented.