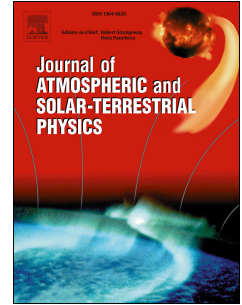


# Accepted Manuscript

Role of anthropogenic emissions and meteorology on ultrafine particle bursts over a high altitude site in Western Ghats during pre-monsoon

Sobhan Kumar Kompalli, S. Suresh Babu, C. Udayasoorian, R.M. Jayabalakrishnan



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1 **Role of anthropogenic emissions and meteorology on ultrafine particle bursts**  
2 **over a high altitude site in Western Ghats during pre-monsoon**

3  
4 Sobhan Kumar Kompalli<sup>1\*</sup>, S. Suresh Babu<sup>1</sup>, C. Udayasoorian<sup>2</sup>, R.M. Jayabalakrishnan<sup>2</sup>

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6 <sup>1</sup>Space Physics Laboratory, Vikram Sarabhai Space Center, Thiruvananthapuram-695022, India.

7 <sup>2</sup>Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India -641003

8  
9  
10 **Abstract**

11  
12 The ultrafine particle number concentration and size distribution during pre-monsoon (spring) over a  
13 high altitude location, Ooty (11.3 °N, 74.4 °E, 2240 m amsl) in Western Ghats, the highest peak in  
14 South India, are examined using campaign based ground observations. The total number  
15 concentrations are in the range ~1000 - 3000 cm<sup>-3</sup> with significant increase (2 to 4 folds) during the  
16 periods of ultrafine particle (UFP) (diameter < 100 nm) bursts. The UFP burst happens mostly during  
17 afternoon/evening with significant enhancement in number concentrations of nucleation (N<sub>nuc</sub>) and  
18 Aitken (N<sub>Aitk</sub>) mode particles. Examination of the association of these events with prevailing  
19 meteorology and trace gas concentrations revealed weaker dependence in general. However, the  
20 association between NO<sub>x</sub> and the UFP concentration indicates the possibility of common source for  
21 both. During the high concentrations of UFP, local winds originated predominantly from south/south  
22 west directions of the study location where the valley region with significant anthropogenic activities  
23 is located. Time of occurrence of the UFP bursts, trace gas concentrations and direction of the winds  
24 points towards the role of valley winds in transporting plume of pollutants to the mountain top  
25 observatory during the daytime.

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