

## **Positive intermediate ion concentrations study with surface temperature at Maitri, Antarctica**

Devendraa Siingh\* (Indian Institute of tropical Meteorology, Pune, India-411008; \*e-mail: devendraasiingh@tropmet.res.in)

### **Abstract:**

The measurements of positive ion concentrations made at Maitri (70° 45' 52" S, 11° 44' 3" E; 130 m above mean sea level) from January 2 to February 24, 2005, in the mobility range of  $0.77 \times 10^{-4} - 0.97 \times 10^{-8} \text{ m}^2 \text{ V}^{-1} \text{ s}^{-1}$  show that diurnal variations in the positive intermediate ion concentrations and the surface temperature are almost parallel to each other on the fair-weather days. The positive intermediate ion concentrations have been observed in excess of  $100 \text{ cm}^{-3}$ , even at night and under cloudy conditions. The relationship between the two parameters show that the measurements can be clearly divided in two distinct groups; first made before January 15 when surface temperature remained mostly above freezing point and the second made after January 25 when surface temperatures remained below freezing point during the nighttime. The positive intermediate ion concentrations increase at the rate of  $7.3 \text{ cm}^{-3}$  per °C in the first group and at the rate of  $31.2 \text{ cm}^{-3}$  per °C in the second group. Simultaneous measurements of the ultrafine aerosol particles in the size range of 4.6 -160 nm diameter confirm the formation of new particles in this range. Measurements of solar radiation made at Maitri suggest that photolytic mechanism alone cannot explain our results. Some other mechanism which can operate at subfreezing temperatures and even in dark may also be responsible for the formation of intermediate ions.