

Observation and modeling of Na layer response to energetic particle precipitation

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Metallic layers, such as Na, Fe, Mg, K, and Ca layers, exist in the mesosphere and lower thermosphere (MLT). The height range of the MLT region corresponds to the ionospheric *D* and *E* regions, and in the polar region energetic particles precipitating from the magnetosphere can often penetrate into the *E* region and even into the *D* region. Therefore, the influence of energetic particles on the metallic layers is of interest regarding changes in atmospheric composition accompanied by auroral activity or geomagnetic activity.

In this study, we have performed a statistical investigation on relationship between Na density and cosmic noise absorption (CNA), which were obtained from 2000 to 2002 at Syowa Station, Antarctic (69.0°S, 39.6°E). From the investigation, we found the Na density decrease in accordance with the CNA increase, i.e., increase in the energetic particle precipitation. In the presentation, we will show these observational results, and discuss causality about the observed relationship based on numerical calculations using our Na chemistry model.

Keywords: Na layer, Energetic particle precipitation, Syowa Station, Na chemistry model