# Relationship between Na layer and CNA variations observed over Syowa, Antarctic

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Metallic layers, such as Na, Fe, Mg, K, and Ca layers, exist in the mesosphere and lower thermosphere, that correspond to the height range of the ionospheric D and E regions. 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 data analysis on Na layer responses to geomagnetic activity using Na density data, together with simultaneous cosmic noise absorption (CNA) data, obtained at Syowa, Antarctic (69.0ºS, 39.6ºE) in 2000-2002. It is found that the Na densities around the topside of Na layers tended to decrease during geomagnetic active days, but in contrast the CNA tended to increase. The amounts of Na density responses, i.e., Na density decrease or Na loss, were increasing with magnetic local time (MLT) from dusk hours to dawn hours, and those of CNA responses, i.e., CNA increase, were also increasing with MLT. Thus, there were clear negative correlations between the Na density and the CNA variations. These results indicate that the the Na loss around the topside of Na layer was induced by the energetic particle precipitation during geomagnetic active days.

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