

A tentative plan to study mesoscale polar thermospheric variations associated with auroral activity using CRL Alaska Project data

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In this paper, we propose a tentative plan, as a sub-project of CRL Alaska project, to study mesoscale (10^0 - 10^2 km) polar thermospheric variations in association with auroral activities using data from instruments developed in CRL Alaska project. CRL Alaska project reached the stage of field experiments with multiple instruments in Alaska Poker Flat and observational scientific research. We propose this plan to carry out the research using the instruments for contributing to understanding of actual environmental mechanism and change. Results from observations and model calculations suggest that in the polar thermosphere electrodynamics such as Joule and particle heating and atmospheric dynamics such as gravity waves and tides obviously affect on the motion and the concentration of neutrals. However, polar thermospheric variations in the mesoscale in association with auroral activities are not well known because of difficulty in observing motions and concentrations of neutrals. We have developed scientific instruments that give us thermospheric and ionospheric variations with high time and spatial resolutions. The target of this plan is to understand mesoscale polar thermospheric variations in association with auroral activities using data observed with these instruments and some model calculations. In the future, we will study relations between mesospheric and lower thermospheric variations using these observed data concerning on effects of not only auroral activities but also atmospheric waves propagating from lower atmosphere.