

Response of the lower thermospheric atmosphere to auroral activities obtained from FPI data at Syowa station

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Polar thermosphere is expected to respond to auroral activities through interaction between neutral and ion particles, Joule heating and particle heating. Therefore, observation of the thermospheric dynamics in the polar regions can be a key factor for understanding the magnetosphere - ionosphere - thermosphere coupling. Purpose of the present study is to reveal the localized relation between auroral activity and the thermospheric temperatures using data obtained with an FPI, which has high temporal (-2 min) and spatial (-a few tens km) resolutions, and with an All-sky Imager (ASI) at Syowa station in 2001. The horizontal distribution of the lower thermospheric temperature from FPI and the distribution of OI557.7nm auroral emission from ASI were derived. Three cases were found in the spatial relation between auroral arc and temperature enhancement in the lower thermosphere. They are; (1) temperature enhanced region was in the poleward side and it moved equatorward with auroral arc, (2) temperature enhanced region was at the zenith while auroral arcs were located at poleward and equatorward side of the zenith, and (3) temperature enhanced region was at the zenith and it was separated from auroral arc in the poleward side. It is noted that these temperature enhancements preceded auroral breakup by 20-50 minutes. In the presentation, these results will be given along with discussion on the cause of the temperature enhancements.