

Effects of auroral Ionosphere on atmospheric electricity

*Osuke Saka¹

1. Office Geophysik

A unique and comprehensible event of atmospheric electricity was observed on 6-7 September 2007 at Syowa station, Antarctica [Minamoto and Kadokura, 2011] (referred to as MK event). Comparing ionospheric sounding data at Syowa station with the MK event, we propose possible scenario of ionospheric effects on the atmospheric electricity.

[Minamoto, Y., and Kadokura, A., 2011: Extracting fair-weather data from atmospheric electric-field observations at Syowa Station, Antarctica, *Polar Science*, 5, 313-318]

The global circuit of atmospheric electricity is generally considered a huge current circuit in the ionosphere-atmosphere-earth system. The currents in this circuit are generated in the atmosphere by charge separation processes in tropical convective storms. Nevertheless, we report here that the current intensity flowing in this current circuit was influenced by the ionospheric conditions at the topside boundary of the atmosphere. Ionospheric influences inferred from the MK event are summarized as follows: (1) currents in the global circuit were suppressed/amplified intermittently by the temporal decrease/increase of ionospheric potentials, (2) currents were intensified by decreasing capacitance of the ionosphere in association with a loss of ionospheric F-Layer.

We emphasize that the global circuit can be regarded as an atmospheric current probe useful for monitoring the ionosphere and magnetosphere.

Keywords: Atmospheric electricity, Auroral ionosphere, Electromagnetic coupling