Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

MIS001-05 Room: 202 Time: May 27 11:45-12:00

Observations of the Atmospheric Electricity at SYOWA station, Antarctica

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At Syowa Station(69.0S, 39.6E), located on East Ongul Island near the continent of Antarctica, an electric field mill has been making observations of and collecting data on the atmospheric electric field. In the Polar Regions, interactions between solar activity and geomagnetic field are shown clearly. Observations of atmospheric electric field in Antarctica are reported, e.g. at Amundsen-Scott(South Pole), Davis(68.5S, 78.0E) and Vostok(78.5S, 107.0E).
Atmospheric electric field data at Syowa Station contain local disturbances caused by near ground weather. For example, ratio of measured atmospheric electric field value between 0 and 300V/m was only 29% from February 2007 to January 2008. In order to analyze the "fair-weather" electric field, it is indispensable to extract data which are free from local disturbances.
The authors examined correlations between atmospheric electric field and near-ground weather and pick out wind speeds and total clouds as factors for criteria to extract "fair-weather" electric field data. Every minute wind and every three hours total cloud data are available at Syowa station. In this study, we regard the three hours cloud values were "0" or "0+" both at start and end of the period as clear fine. We use median of wind speed value an hour.
We pick up periods that atmospheric electric field value was between 0 and 300V/m, and it was clear fine from two years data from February 2005 to January 2006 and February 2007 to January 2008. Periods that wind speeds were less than 6m/sec account 94% of the selected hours. We provide that wind speed<6m/sec and whether is clear fine as a criteria to extract "fair-weather " electric field. We extracted "fair-weather" electric field with the criteria from three years data; from February 2005 to January 2006 and February 2007 to January 2009. Diurnal variation of the extracted data in January matches with the that at Vostok Station in 1998(Frank-Kamenetsky et. al. 2001).

Reference
Frank-Kamenetsky, A. V., Troshichev, O. A., Burns, G. B., Papitashvili, V. O., 2001,Variations of the atmospheric electric field in the near-pole region. Journal of Atmospheric and Solar-Terrestrial Physics,Vol.61, 1347-1356

Keywords: Atmospheric Electricity, Antarctica, SYOWA station, Global circuit