

## EISCAT レーダーで観測された電離圏イオン温度の長期トレンド

小川泰信<sup>1</sup>、元場哲郎<sup>1</sup>、Ingemar Haggstrom<sup>2</sup>、野澤悟徳<sup>3</sup>

<sup>1</sup>国立極地研究所

<sup>2</sup>EISCAT 協会

<sup>2</sup>名古屋大学太陽地球環境研究所

## Long-term variations and trends of ionospheric temperatures observed with the EISCAT Tromsø UHF radar

Yasunobu Ogawa<sup>1</sup>, Tetsuo Motoba<sup>1</sup>, and Ingemar Haggstrom<sup>2</sup>, and Satonori Nozawa<sup>3</sup>

<sup>1</sup>National Institute of Polar Research

<sup>2</sup>EISCAT Scientific Association

<sup>2</sup>STEL, Nagoya University

Model calculations predict mesospheric and thermospheric cooling in response to rising greenhouse gas concentrations [e.g., Roble and Dickinson, 1989; Cicerone, 1990]. Data obtained with the EISCAT radars can potentially discover such signatures of long-term global changes. In order to investigate the long-term variations of polar ionosphere and thermosphere more precisely, we have been developing a complete and homogeneous EISCAT database.

Based on the database obtained from the EISCAT Tromsø UHF radar observations (at 69.6 deg N, 19.2 deg E) between 1981 and 2011, long-term variations and trends of ion and electron temperatures have been examined. The ion temperature at 400 km altitude is higher during the solar maximum (~1500 K) than during the minimum (~1100 K). The electron temperature exhibits a clear seasonal variation, particularly during the solar maximum. In order to obtain a long-term trend of ion temperature, effects of the solar activity, seasonal variation, and geomagnetic activity in the ion temperature variation are removed. An initial result shows a cooling trend of about -2 K/year at altitudes between 200 and 350 km, which is close to the trend found with the Millstone Hill IS radar in the middle latitude (46.2 deg N, 288.5 deg E) [Zhang et al., 2011].

In this paper we explain our analysis method for the long-term variations and trends of ionospheric temperature in the polar ionosphere, and discuss the plausible mechanisms.

### References

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