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Ground-based mesopause temperatures at high-latitude over Yakutia:Comparison with SABER measurements

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Ground-based mesopause temperature at high-latitude over Yakutia: Comparison with SABER measurements

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Rotational temperatures obtained from the O2 Atmospheric (0?1) nightglow band, with an infrared spectrograph at the Maimaga station (63 N, 129.5 E) for the period September 2002 to March 2013 are presented. Time series includes the years of maximum and minimum solar activity. The set of spectrograph data has been used to analyze the seasonal behaviour of the mesopause temperatures. Atmospheric temperatures deduced from infrared spectrograph and from satellite observations with the Sounding of the Atmosphere using Broadband Emission Radiometry (SABER) instrument on board the TIMED satellite, have also been compared.

The temperatures measured during the satellite passes at distances not larger than 300 km from the intersection of the spectrograph sighting line with the oxygen emitting layer (~94 km) have been compared. A seasonal dependence is observed regarding the difference between the ground based and satellite measurements. However, the time variations in the temperature obtained with the ground based device and on the satellite are similar. Based on the performed analysis, it has been concluded that a series of oxygen rotational temperatures can be used to study temperature variations on different time scales, including long-term trends at the temperature emission altitude (~94 km).

Keywords: mesopause temperature, O2 airglow, SABER measurements