

Studies on the behavior of atmospheric tide in the polar upper atmosphere(15) -A temperature tide comparison-

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Meteor radars can give neutral temperature from decay rate of echo returns which reflects ambipolar diffusion of ionized particles in the meteor trail. Temperature values are actually derived in our study by assuming the so-called pressure model and have compared well with those by optical methods as OH airglow observation in winter and also a Lidar. The expected uncertainty of radar-derived temperature has also been found to be about 17K. Despite this variance, day and night and all weather continuous radar observation of temperature at lower mesospheric region is quite unprecedented and appropriate for extracting wave components in the temperature variation.

In the present study, tidal component of neutral temperature at 90km are re-estimated based on a few to several years of data in Svalbard and Tromsø. Generally, tidal amplitude for temperature at polar latitudes is a few K at meteor heights and becomes larger with increasing altitude. Neutral temperature around this height is also inferred from ion temperature measurement of EISCAT long run, e.g., in November 2003 or later. In this, care is taken of the frictional heating effects at disturbed conditions. These results are compared newly with temperature tide in the NCAR WACCM model as well as Kyushu GCM model and ATM2 result for more critical study.