PEM05-05　　　　　　　会場:424　　　　　　　　　　　　　　時間:5 月 2 日 10:15-10:30

The saturation of gravity waves traveling from the lower to the upper atmosphere observed by the MU radar and understood

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The MU radar of Kyoto University was constructed in 1984. One of the main purpose of the radar construction is to observe atmospheric gravity waves particularly to find how gravity waves saturate in traveling from the lower atmosphere to the upper atmosphere. In the 1980s Matsuno, Geller and others put forwards an idea suggesting that the gravity wave saturation may release momentum for driving the mesosphere general circulation. Their idea is based on rocket and satellite global- observation of winds and temperature varying peculiarly with seasons in the mesosphere.

Our MU radar observation has been successful in proving the gravity wave momentum release to be in a good agreement with the required quantity for the mesosphere general circulation. Also our success of precise measurements of the saturated gravity wave power spectrum strongly supports to explain the gravity wave saturation idea in terms of a simple theory based on the linear or monochromatic gravity wave theory by Hines in 1960.

Our theory on the basis of our MU radar observation shows that the gravity wave saturation is attained for each gravity wave in amplitude reaching the phase speed due to a balance between the increasing amplification expected by the linear theory and non-linear braking effects. We can consider that the original gravity wave dispersion relation is maintained upon the saturation.

Gravity waves should experience a number of such saturations before reaching the thermosphere on the way.