Meteor Radar Observations of Gravity Wave Drag in the MLT Region over Thumba

KARANAM KISHORE KUMAR and SHERINE RACHEL JOHN Space Physics Laboratory, Vikram Sarabhai Space Centre, Thiruvananthapuram-695022, India

In the vertical coupling of the Earth's atmosphere, the role being played by the gravity waves is unanimously concurred by both theoretical, modeling and observational studies. Wave-Mean flow interaction and wave- wave interaction are the two major processes through which the gravity waves couple different regions of the atmosphere. To quantify these aspects of gravity waves, the gravity wave momentum flux and drag are estimated in the mesosphere-lower thermosphere (MLT) region using meteor wind radar observations over Thumba (8.5°N, 77°E). The radial velocity of the meteor winds are extensively used for this purpose. The momentum flux is first estimated and then gravity wave drag is estimated. These analyses provided a unique opportunity to assess the gravity wave contributions in driving the MLT circulation and short-term variability. As we know that the high frequency gravity waves generated by tropical deep convective system have potential to penetrate into the lower thermosphere, in the present study, an attempt is made to explore the gravity wave variance during the passage of deep convective systems providing an evidence for lower and middle atmospheric coupling through convectively generated gravity waves. Thus this study provided a greater insight into the convectively generated gravity waves reaching the MLT region and their consequences.

Keywords: Gravity waves, meteor wind radar, MLT region