

レーダー・ライダー・大気光イメージャで観測された中間圏・下部熱圏のシア不安定と上下混合

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A shear instability and vertical mixing event in the MLT region observed by a radar, a lidar and an airglow imager.

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Simultaneous airglow imaging, radar meteor wind, and sodium temperature lidar measurements have been carried out on October 31, 2005 at Shigaraki MU observatory. North-South aligned band structure and NW-SE aligned ripple structures were observed in OI 5577 emission. Meteor wind showed south-westward wind shear with a peak amplitude of 46 m/s/km at 90 km. Combined with temperature profiles obtained by the sodium lidar, Richardson number (Ri) at the presence of ripple was close to 0.25. When Ri became large, ripples disappeared and band structure became clearer. This event is considered as a shear instability event at around 90 km altitude due to the enhanced wind shear of large scale inertia gravity wave or tides, but the band structure may not be related to the event. After the ripple event, Na density around 90 km increased significantly, with a 30 % increase of column density. Temperature was also increased by about 20 K at around 90 km. Potential temperature profiles were also investigated from meteor echo decay rate and Na temperature. It is suggested that the all these variations were caused by a vertical mixing event due to the shear instability.