

MU レーダー超多チャンネルイメージングによる中緯度電離圏 Type-1 エコーの空間構造の研究

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Imaging observation of mid-latitude type-1 echoes by MU radar ultra-multi-channel system

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Type-1 echoes are coherent scatter echoes with very high Doppler velocities equal to or larger than the ion acoustic velocity which are believed to be due to the Farley-Buneman (F-B) or modified two-stream instability. They have been commonly observed in the equatorial or auroral electrojets. They are not so common in the mid-latitude ionosphere where the electric field is generally weak, because the relative drift velocity between ions and electrons faster than the ion acoustic velocity is required for the F-B instability to occur. However, they are sometimes observed in the mid-latitude associated with the sporadic E layer. The mechanism how such strong electric field can be generated in the mid-latitude has not been well understood.

With the middle-and-upper atmosphere (MU) radar ultra-multi-channel system, spatial structures of mid-latitude E region type-1 echoes were studied with the radar imaging technique. Observations were conducted from 12 to 15 June 2006. Type-1 echoes were observed on 12 and 14 June 2006. Those echoes were not associated with clear quasi-periodic echoes. They were localized in small patchy regions drifting southwestward. They persisted for more than 7 minutes while they drifted across the radar field of view.

At the meeting, mechanisms that have been proposed to generate strong electric field to excite F-B instability will be examined with our observational results.