

Fine structures of E region quasi-periodic echoes observed by the MU radar

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We observed E region field-aligned irregularities with the MU radar at Shigaraki on August 16-19,1999 to obtain data of echo power intensity, Doppler spectrum, and spectral width of the radar echoes. In this paper, we examine a relationship between the echo power and Doppler velocity related to strong quasi-periodic echoes and discuss the generation mechanism of these echoes.

We conducted MU radar observations of field-aligned irregularities (FAI) in the E region on August 16-19, 1999. The MU radar echoes from FAI are classified into two types; QP (quasi-periodic) echoes appearing at 100-120km altitude with 5-10 min periods after sunset and continuous echoes appearing at 90-100 km after sunrise. It is known that QP echoes happen with sporadic E (Es) layer. But the process of their generation is still unknown.

From the MU radar observations we obtained data of echo power intensity, Doppler velocity and spectral width. In this paper we analyze in detail these data for periods of 2020-2040 LT when strong QP echoes occurred. It is stressed that behaviors of the echo intensity and Doppler velocity are very complicated and there is no one-to-one correspondence between them.