Quasi-periodic echoes from nighttime Es layers observed with the SuperDARN Hokkaido radar

Tadahiko Ogawa[1]; Nozomu Nishitani[2]; Yuichi Otsuka[2]; Takuya Tsugawa[1]

[1] NICT; [2] STELAB, Nagoya Univ.

First SuperDARN HF radar observations of quasi-periodic echoes (QPE) from nighttime sporadic-E (Es) layers in summer are presented. We case-study data from the 11-MHz SuperDARN Hokkaido radar with a range resolution of 15 km, together with ionospheric total electron content (TEC) data over Japan. Southwestward-moving Es patches contain QPE with periods of a few to about 5 minutes. Movement of the patches is closely related to spatiotemporal variation of simultaneously observed, southwestward-propagating medium-scale traveling ionospheric disturbances in the F region. QPE regions tend to be embedded within and around suppressed TEC regions. These facts imply an important role of electrical coupling between the E and F regions in inducing Es irregularities. In addition, the radar waves are largely refracted downward during propagation due to strong Es, resulting in that the QPE regions are located at ranges nearer than expected.