Mapping of the tweek reflection height observed by low-mid latitude VLF network system

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Tweek atmospheric is an effective tool for investigating the sub-ionosphere. Tweek atmopsherics are VLF/ELF waves that are radiated from lightning discharges and propagate in the Earth-ionosphere waveguide over several of megameters with reflecting between the bottom of the ionosphere and the ground or sea. Tweeks can be observed only in nighttime, because there is no strong solar ionization at night and the nighttime attenuation is much less than daytime one. Tweek atmospherics are reflected at a height where the equivalent electron densities are 20 - 30 cm^{-3}. Descent (rise) of the reflection height corresponds to increase (decrease) in electron density in the ionospheric D- and lower E-regions.

The VLF observation network in Southeast Asia consists of three observation sites: Tainan (geographic latitude, 23.08N) in Taiwan, Saraburi (14.53N) in Thailand and Pontianak (0.0N) in Indonesia. We installed the VLF/LF observation system at Tainan in November 2008 and at Saraburi in November 2009. The VLF/LF observation system is going to be installed at Pontianak, Indonesia in August 2010. The aim of the Southeast VLF/LF observation network is to investigate ionospheric disturbances associated with energetic particle precipitation from the inner radiation belt, thunderstorm and lightning, Sprites and Elves, and terrestrial gamma-ray flashes.

In addition to above three observation sites, we estimate the tweek reflection heights observed at Moshiri (44.37N) and Kagoshima (31.48N), Japan. We can examine the location of the propagation paths by using observation data obtained at more than three sites. In the session, we will compare between the lightning locations estimated from tweeks and WWLLN data.