

Time Histories of Formation, Sustenance and Decay of E_S Echoes using HF Doppler Radar

C Raghava Reddi & MSSRKN Sarma
Ionosphere and Space Research Laboratory, Physics Department,
Andhra University, VISAKHAPATNAM 530 003

Abstract: This presentation is based on 5.5 MHz coherent Doppler radar observations of E_S echoes at Visakhapatnam. The critical frequency of normal E region at Visakhapatnam almost never exceeds 5.0 MHz. The radar pulse width is 100 μ sec and the PRF is 50 per sec. The phase and amplitude of the echo are recorded as $I = A \cos \varphi$ and $Q = A \sin \varphi$ components. A is the amplitude and φ the phase of the echo. The E_S echo at Visakhapatnam has fast changing structure and is spread in height. The E_S echoes for each transmitter pulse were sampled at intervals of 50 μ sec in 16 successive range bins.

Based on the observations, E_S was classified as Blanketing type and Patchy type. The blanketing E_S often show multi-hop reflections, and the Doppler velocities are rather small and show increases and decreases over time scales of a few tens of minutes. The echo is usually very strong and often the F region is obscured. Further the echo does not show any spreading in range.

In contrast to blanketing E_S the patchy type of E_S show fast changes in different parts of the echo. It usually appears as a strong discrete echo with very slow Doppler velocity. As time progresses the following changes, not necessarily always, occur in the echo. (1) Additional echoes with rapidly changing Doppler appear immediately following the main echo thus forming a spread E_S echo. (2) The main echo may shift to the center of the spread echo. (3) The main echo shifts to the trailing edge of the spread echo. The decay sequence of the patchy E_S echo is the disappearance of the echoes other than the main echo and lastly the main echo.

The time histories of the signal strength and Doppler frequency shift in different parts of the E_S echo will be described and interpreted.

**Corresponding author's e-mail address: << crreddi@sancharnet.in >>
<< crreddi69@yahoo.com >>**