

Decay of 3-m-scale ionospheric irregularities associated with a plasma bubble observed with the Equatorial Atmosphere Radar

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Decay processes of 3-m-scale ionospheric irregularities associated with a plasma bubble are investigated with multi-instrument observations including the Equatorial Atmosphere Radar (EAR), 630-nm airglow imager, and ionosondes. The EAR's electronic beam steering capability allowed us to see the temporal evolution of 3-m-scale irregularities associated with plasma bubbles in two-dimensional view. Around midnight on 28 and 31 March 2006, the EAR detected 'fossil' plasma bubbles which drifted into its field of view (FOV). When their eastward drift motion slowed down and they finally stagnated, 3-m-scale irregularities decayed away. These results suggest that the instability driven by the eastward neutral wind could keep the 3-m-scale irregularities in the fossil plasma bubbles

active for several hours after sunset. The stagnated plasma bubbles drifted downward with the ambient westward electric field resulted in the backscatter echo patterns on the range-time-intensity (RTI) plots which look like those associated with the mid-latitude plume.