STRUCTURED DC ELECTRIC FIELDS WITH AND
WITHOUT ASSOCIATED PLASMA DENSITY
GRADIENTS OBSERVED WITH THE C/NOFS
SATELLITE

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DC electric field observations and associated plasma drifts gathered with the Vector
Electric Field Investigation on the Air Force Communication/Navigation Outage
Forecasting System (C/NOFS) satellite typically reveal considerable variation at large
scales (~100's of km), in both daytime and nighttime cases, with enhanced structures
usually confined to the nightside. Although such electric field structures are typically
associated with plasma density depletions and structures, as observed by the Planar
Langmuir Probe on C/NOFS, what is surprising is the number of cases in which large
amplitude, structured DC electric fields are observed without a significant plasma
density counterpart structure, including their appearance at times when the ambient
plasma density appears relatively quiescent. We investigate the relationship of such
structured DC electric fields and the ambient plasma density in the C/NOFS satellite
measurements observed thus far, taking into account both plasma density depletions
and enhancements. We investigate the mapping of the electric fields along magnetic
field lines from distant altitudes and latitudes to locations where the density
structures, which presumably formed the original seat of the electric fields, are no
longer discernible in the observations. In some cases, the electric field structures and
spectral characteristics appear to mimic those associated with equatorial spread-F
processes, providing important clues to their origins. We examine altitude, seasonal,
and longitudinal effects in an effort to establish the origin of such structured DC
electric fields observed both with, and without, associated plasma density gradients.