Title:	A statistical study of satellite traces and evolution of equatorial spread F
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Abstract:	The ionosonde observations made at 5-min intervals at the Indian dip equatorial station Tirunelveli (8.7°N, 77.8°E geographic; 1.1°N dip latitude) from March 2008 to February 2009 during the extended solar minimum period are used to study the interlink between equatorial spread F (ESF) and satellite traces (STs) which are assumed to represent tilts in the bottomside iso-electron density surfaces probably caused by large-scale wave-like structures (LSWS). The data show different patterns of ESF onset in the bottomside F region, which are illustrated through examples. In addition, the statistics of occurrence of ST and its relation to the formation of ESF are studied. The results indicate that (1) the zonally drifting ESF irregularities can be differentiated from those forming over the observing station. (2) Nearly half of the ESF events were preceded by ST. (3) In about 30% of the cases of occurrence of ST, ESF was not formed afterwards implying that LSWS may not always lead to ESF. (4) The percentage of ESF following ST was high in summer and increased with the time of the night. (5) Following the first occurrence of ST, the ESF onset was delayed by about 30 min on the average suggesting that ST may be used as a precursor of ESF. (6) Pre-reversal enhancement (PRE) of upward plasma drift was found insignificant during the period of study. The trapping of high-frequency radio waves between the E and F regions during intense sporadic E is also illustrated.
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