

Spatial and temporal variability of the low- and mid-latitude ionosphere as reveal by modal decomposition

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Abstract

We examine two approaches to capture the modes of spatial and temporal variability observed in the ionosphere: 1. decomposition into modes as functions of local time and zonal wavenumber and 2. analysis using empirical orthogonal function decomposition and the corresponding principal component analysis technique. The spectral analysis of the different time series of reveals how different mechanisms such as solar flux variation, change of the orbital declination, nonlinear mode coupling and geomagnetic activity are separated and expressed in different modes. We also perform similar analysis performed on output from the TIE-GCM to provide insight on the observed phenomena.