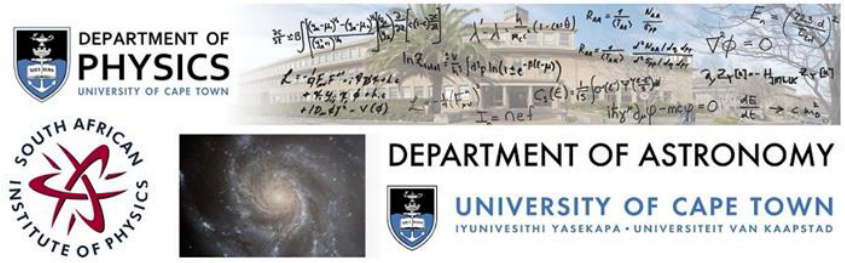

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Plasma Drift Modeling: Multivariate Analysis

Tuesday, 5 July 2016 11:50 (20 minutes)

Abstract content
   (Max 300 words)
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Quantitative estimate of equatorial plasma drift is required since it is a main transport mechanism causing plasma density fluctuations at low and equatorial latitudes. In practice, this has an impact on radio communication and navigation systems. It has been established that taking difference of horizontal magnetic field ΔH between ground-based magnetometers stationed 6 – 9 -degrees off the magnetic equator provides realistic measure of daytime plasma drift velocities. Although drivers of this phenomenon/process could be associated with horizontal neutral wind; its direct measurements are lacking and models estimating it could be unreliable. In this work, daytime magnetic field-inferred equatorial plasma drift is modelled using multivariate analysis. Seasonal, diurnal and ionospheric disturbances are also considered through various modeling inputs as drivers. In contrast to traditional least squares technique, the analysis techniques avoid multicollinearity and uses variable selection methods. The model shows appreciable correlation of the modeling inputs with the plasma drift. Since solar zenith angle is included in the model formulation, plasma drift at other low –latitudinal regions could be estimated. Since daytime equatorial plasma drift is independent of altitude in the range of 150- 180 km, the modelled plasma drift could be verified by satellite data at low-latitudes.

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