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REGIONAL GPS TEC MAPPING USING ARTIFICIAL NEURAL NETWORKS.

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Abstract.

This paper presents results obtained by regionally mapping Total Electron Content (TEC) derived from the Global Positioning System (GPS) observations as a function of different parameters that influence ionospheric variability. Parameters that contribute to TEC fluctuations are categorised into periodic, random and positional components. The periodic component (which consists of seasonal and diurnal variations) form the initial modelling parameters to simulate TEC time series behaviour. The random and positional components corresponding to magnetic and solar activities; and latitudes and longitudes respectively, are subsequently included into the neural network model to illustrate the level of influence for each parameter. Artificially generated TEC will be compared with GPS derived TEC during both quiet and disturbed conditions over Southern Africa.