

PREDICTION OF THE IONOSPHERIC SCINTILLATION USING DATA MINING TECHNIQUES

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Abstract: Irregularly structured ionospheric regions may cause amplitude and phase fluctuations of radio signals. Such distortion is called ionospheric scintillation. Ionospheric irregularities affect the space weather, since they present large variations with the solar cycle and during solar flares and coronal mass ejections. In general, navigation systems such as the Global Positioning System (GPS) and telecommunications systems are also affected by the scintillation. The aim of this work is to apply data mining for the prediction of ionospheric scintillation. Data mining can be divided into two categories: descriptive or predictive. The first one describes a data set in a concise and summarized way, while the second one, used in this work, analyses the data to build a model and tries to predict the behavior of a new data set. In this study we employed data series of ionospheric scintillation and other parameters such as the level of solar activity, vertical drift velocity of the plasma at the magnetic equator and magnetic activity. We used bagging algorithm that is a technique applied in data mining for prediction. The results show that prediction of the ionospheric scintillation occurrence during the analyzed period was possible regardless of the high variability of the ionospheric parameters that affect the generation of such irregularities.