

Maximum Usable Frequency Calculated Over Cachoeira Paulista Using TEC Data

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In this study, we present a method to calculate the Maximum Usable Frequency (MUF) using Total Electron Content (TEC) data registered over Cachoeira Paulista (22.5°S; 45°W). The data were downloaded from Brazilian GNSS receiver network RBMC (Rede Brasileira de Monitoramento Contínuo). MUF is the highest radio frequency that can be used for electromagnetic wave propagation between a pair of terminals by ionospheric refraction at a specified time. In this way, MUF is reliant of the ionospheric electronic density and can be calculated knowing the F₂-layer critical frequency (f_oF_2) and its corresponding virtual altitude ($h'mF_2$). Our idea is to extracted the values f_oF_2 from TEC data and develop an empirical representation for $h'mF_2$ based on ionogram data registered by a digisonde operating at Cachoeira Paulista's station. The results, representative of equinoctial period and geomagnetic quiet conditions, are compared with experimental data.

In fact, we present the first step to develop a MUFs prediction model for the Brazilian sector which is important for the national radio communication community.