# LOW IONOSPHERE ELECTRON DENSITY PROFILES FOR THE ANTARCTIC AND SOUTH ATLANTIC GEOMAGNETIC ANOMALY REGIONS ASSOCIATED TO PCA EVENTS

by

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## ABSTRACT

Very low frequency (VLF) phase and amplitude signals simultaneous received in Atibaia (23°11'S; 46° 33W) and Curitiba (25°35'S; 49°16'W) during the exceptionally intense proton-event that occurred on August 4, 1972, lead to unique electron-density profiles of the lower ionosphere obtained for the southern hemisphere. Maximum phase and amplitude deviations measured for VLF long-distance propagation path NWC (Australia) - Atibaia (SP) were analysed using characteristic parameters of VLF radio waves propagation through Earth-ionosphere waveguide. This peculiar propagation path has a total length of 14,600 km, crosses partially the South Atlantic Geomagnetic Anomaly and the Antarctic Continent, reaching a maximum geomagnetic latitude of 70°S. Comparing these experimental results to data available for similar propagation path in the northern hemiosphere and also to several transequatorial propagation paths received simultaneously in Atibaia, it was possible to deduce three independent electron density profiles for different portions of propagation path, depending on the value of L (McIlwain parameter) reached in the following cases: a) Anomaly Region: $1.15 < L < 2$ (low latitude), b) Outer Radiation Belt: $2 < L < 4$ (medium latitude), c) Antarctic region: $L > 4$ (ligh latitude). The resulting profiles are presented together with profiles obtained using different techniques, and different propagation paths, for the same event and also for less intense events.