VLF REMOTE SENSING OF LOWER IONOSPHERE DISTURBANCES AT A MEDIUM LATITUDE SITE AND THEIR CORRELATION WITH HIGH ENERGY ELECTRON FLUX

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Precipitations of relativistic electrons down to the lower ionosphere mainly at subaurotal latitudes ($4.5 < L < 7$) are events well known since some decades. We present results from a medium latitude site ($L = 2.2$) gained from continously monitoring VLF transmitters at medium distances (800-900 km) with two receivers at a short distance (35 km = roughly 2 wavelenghths). Data analysis of the synchronuous signals allows for eliminating local disturbances and environmental noise. The first principal component of the 2 receiver signal time series is correlated with electron flux data ($E > 0.6$ MeV) from the geosynchronuos satellite GOES-10 and also compared to ACE satellite solar wind data and geomagnetic activity. With enhanced electron flux activity we find drops in the avarage VLF transmitter night signal strengths but also changes of the variation of the signal strengths on minute to hour time scales which we quantify by using a 3 hour nighttime Fourier Transform based variation index. Finite Difference Time Domain (FDTD) calculations of the propagation cavity are used to assess the envolved lower ionosphere parameter changes.

ionosphere, VLF, relativistic electrons

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