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Low-altitude radiation belts destabilization by man-made waves and estimation of the equatorial thermal plasma density between 2000 and 5000 km

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The radiation belts as seen at low altitudes (700 km) with the DEMETER satellite show discrete large scale energy structures caused by the interaction of electrons with waves. An energy-L dispersed structure with one or two superposed energy bands due to the interaction of electrons with the powerfull NWC transmitter at 19.8 kHz is seen at all longitudes at L values between 1.4 and 1.8, when the station is in the local night and when the transmitter is on. At a fixed L value, the energy of the resonating electron varies with the thermal plasma density in the equatorial plane. This density changes with, magnetic activity and UV solar flux. We compare the experimental results with experimental data and try to disentangle these various effects on the equatorial thermal plasma density between 2000 and 5000 km. Two other structures are briefly presented and discussed: A structure with superposed multiple energy bands measured West of America inside the inner radiation belt (L=1.15-1.35) with the electron energy spectra at a given location showing up to 10 peaks in the energy range from 70 keV to 1 MeV, and a structure with up to 12 energy peaks between 200 kev and 2.5 MeV measured west of South Africa at L Value of about 2.7. For this last structures the multiple electron energy peaks are separated by the same energy at a given location. This is tentatively interpreted as indicating that these structures are due to the high orders resonnance of electrons with whistler waves. Other possibilities are also presented.