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Radiation Belt Low-Energy Electron Injections at low L-shells and Electron Lifetime During Weak Storms Around Solar Minimum

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Data taken around the last minimum of solar activity offers the possibility to study the effect of weak to moderate storms (Dst<70 nT) on the radiation belt using the low-altitude Demeter satellite. These quasi- recurrent storms are caused by the interaction of the magnetosphere with solar wind stream interfaces with high interplanetary magnetic field and velocity. Energetic electrons in the 100-200 keV energy range are systematically injected down to L values as low as 2.2 during weak storms/substorms. Only the period from January 2009 to March 2010 is free of low L injections. The traditional slot, which represents a void of high- energy electrons (several MeV) is thus populated by electrons in the range 100-500 keV. At higher L shells, (3.5-4), the lifetime of the 150 keV is on the order of one day. It is the steep increase of their lifetime at lower L=2-3, which is at the root of the formation of the slot structure with enhanced 100 keV electron fluxes. We rely these experimental results with those expected from the interaction of electrons with plasmaspheric hiss. The strong gradient in computed lifetime around L=3 (Meredith et al., 2008) is able to provide a framework for the observations which are also in qualitative agreement with the statistical work of Benck et al. (2010). At higher L shells, during weak to moderate storms, the electron lifetime is almost linearly increasing with L up to at least L= 6.6. Direct comparison between Demeter data at L=5.5 and the LANL satellites at L=6.6 show a good agreement between the lifetime of >50 keV electrons which reach a week. We discuss this result in the frame of the interaction of particles with whistler chorus.