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Drift-resonant acceleration of electrons in response to impulse-excited ULF waves

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We present results of modelling the drift-resonant energetic electron response of the outer radiation belt to sudden impulses in the solar wind. It is demonstrated through theory and numerical simulation that large amplitude ULF waves are excited more or less instantaneously throughout the magnetosphere in such cases. It is shown that the spectrum of the waves excited is consistent with the Alfven continuum. We review recent observations of impulse-excited ULF waves by the NASA Van Allen Belt Probes, and compare the observed spectra and oscillations in phase space density with results from numerical simulations. We present results from a transport model that advances phase space density in electric and magnetic fields obtained from a global MHD model (the LFM model). We show that there is a causal connection between observed ULF waves and oscillations in satellite electron flux. We evaluate the energy range and dynamics of the electrons that are energized through drift-resonance with ULF waves.