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On the effect of ULF waves on the outer radiation belt during geomagnetic storms

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The inner magnetosphere is a very important region to study, as with satellite-based communications increasing day after day, possible disruptions are especially relevant due to the possible consequences in our daily life. It is becoming very important to know how the radiation belts behave, especially during strong geomagnetic activity. The radiation belts response to geomagnetic storms and solar wind conditions is still not fully understood, as relativistic electron fluxes in the outer radiation belt can be depleted, enhanced or not affected following intense activity. Different studies show how these results vary in the face of different events. As one of the main mechanisms affecting the dynamics of the radiation belt are wave-particle interactions between relativistic electrons and ULF waves. In this work we perform a statistical study of the relationship between ULF wave power and relativistic electron fluxes in the outer radiation belt during several geomagnetic storms, by using magnetic field and particle fluxes data measured by the Van Allen Probes between 2012 and 2017. We evaluate the correlation between the changes in flux and the cumulative effect of ULF wave activity during the main and recovery phases of the storms for different position in the outer radiation belt and energy channels. Our results show that there is a good correlation between the presence of ULF waves and the changes in flux during the recovery phase of the storm and that correlations vary as a function of energy. Also, we can see in detail how the ULF power change for the electron flux at different L-shell We expect these results to be relevant for the understanding of the relative role of ULF waves in the enhancements and depletions of energetic electrons in the radiation belts for condition described.