Electron drift echoes induced by negative solar wind dynamic pressure pulses

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Sudden dropouts of the relativistic electron fluxes with drift echoes are closely related to a positive solar wind dynamic pressure pulse, such as an interplanetary shock impact on the magnetosphere. In this study, we further examine how magnetospheric energetic particles response to a negative solar wind dynamic pressure pulse on the 11th May 2017. During this event, sudden dropouts of energetic electron fluxes with an energy of 200 keV−750 keV and enhancements of the relativistic electron fluxes of 0.85 MeV−2.7 MeV were observed simultaneously by both Van Allen Probes. The periodic electron flux dropout-recovery or enhancement-decay signatures, which are attributed to electron drift behaviors, exhibited energy dependence. Based on the electron phase space density profile and the induced electric field variation, we interpreted this phenomenon as the consequence of radially outward transportations of electrons caused by the electric field impulse induced by the negative dynamic pressure pulse.