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MODELING OF INNER MAGNETOSPHERE UNDER THE INFLUENCE OF A MAGNETIC CLOUD ASSOCIATED WITH AN ICME: ENERGY CONVERSION AND ULF POWER SPECTRAL DENSITY

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The objective of this work is to carry out a broad study of the coupling effects of a geoeffective interplanetary structure of the magnetic cloud (MC) type that occurred between May 27-29, 2017 and promoted an intense impact on the global and inner magnetosphere in terms of energy conversion (magnetic, kinetic and internal) and the emergence of storm, substorm, intensification of electric and magnetic fields as well as the generation of electromagnetic waves in the ultralow frequency (ULF) range, specifically from 0.5 to 16.6 mHz. To carry out this study we fed the SWMF/BATSRUS global magnetohydrodynamic code with the MC solar wind data as obtained by the DISCOVERY satellite. SWMF/BATSRUS has been coupled with two other internal magnetosphere models, namely, Rice Convection Model and the ionospheric electrodynamics model in order to better describe the physical processes occurring in the inner magnetosphere. The regions of interest were both the dayside and nightside equatorial planes which spanned radial distances going from 3 to 9 Earth radii that encompasses the equatorial radiation belts regions. The global behavior of the energy conversion rate and the generation of disturbances in the ULF frequency range were analyzed for each phase of the MC in the aforementioned regions of interest. This study allows us to obtain physical information on the global distribution of the energy conversion rate and the intensification of ULF waves during different stages of the MC interaction with Earth's magnetosphere.