Paper ID: 27774
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48th SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (D5)
Prediction and measurements of space weather conditions and impacts on space missions (3)

Author: Mrs. Sandrine Rochel
ONERA, France

A RADIATION BELTS DISTURBANCE STUDY IN THE SPACE WEATHER POINT OF VIEW

S. ROCHEL, D. BOSCHER, R. BENACQUISTA, J. F. ROUSSEL

Abstract

The radiation belts are a key region located close to the Earth, where the satellites travel. They are located in the centre of the magnetosphere and constitute a very sensitive region to the variations of magnetosphere activity. A magnetosphere is an isolated sphere dropped inside the solar wind. She is in equilibrium in the solar wind. If the solar wind parameters change, then, the magnetospheric balance is upset. Moreover, the magnetosphere is not a solar-wind-proof bulkhead. Using several processes, particles and energy from the solar wind can go inside, disturbing the magnetosphere and being responsible of variation of currents and generation of waves. Those phenomenon allow to absorb the energy overflow and the come back to the equilibrium. Nevertheless, those phenomenon also impact strongly the radiation belts particle flux: during magnetic storms or substorms those fluxes can increase strongly. The come back to the equilibrium state can be very long for radiation belts and last several months. In the terrestrial magnetosphere, many satellites travel in this region where energetic particles fluxes can destroy their instruments. The prediction of the radiation belts fluxes increasing is today a challenge in which this study will participate. The purpose of this work is first to understand the solar wind main structures (CMEs and CIRs) impact in the terrestrial magnetosphere and in the radiation belts fluxes by using the magnetic index Kp and the satellites data. We will present a comparative study of the impact of the CIRs and of the CMEs on the radiation belts fluxes, discuss how the impact of the multiple events (CMEs following CMEs or CIRs, or CIRs following CMEs or CIRs) in the magnetosphere could be estimated and bring new useful information to go to a prediction of the radiation belts disturbances.