



The magnetospheric and ionospheric contribution to Geomagnetically Induced Currents during the September 6, 2017 Geomagnetic Storm.

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The impact of the interplanetary shocks and of the Coronal Mass Ejections (CMEs) on the Earth's magnetosphere perturbs the geomagnetic field causing the occurrence of geomagnetic storms. Such extremely variable geomagnetic fields trigger geomagnetic effects measurable not only in the geospace but also in the ionosphere and at the ground. The rapid variations of the geomagnetic fields during geomagnetic storms generate intense geomagnetically induced currents (GICs). In recent years, GIC impact on the power networks at middle and low latitudes has attracted attention due to the expansion of large-scale power networks into these regions. In this work we analyzed the magnetospheric and ionospheric response to the September 6, 2017 geomagnetic storm. Using the Piersanti et al. (2016) model on magnetic field measurements from ground station at low and high latitude, we reconstructed the global ionospheric current flow pattern separating the magnetospheric and ionospheric contribution to the magnetic field perturbations. Using the local magnetic field measurements and a 3D ground conductivity model (Aleksiev et al., 2015), we also reconstructed the geoelectric field of magnetospheric and ionospheric origin paying attention to the respective contribution from low to high latitude. The study also indicated that the eastward component of the geoelectric field is dominant for low-latitude locations during the Storm Sudden Commencements related to the impact of the interplanetary shock preceding the interplanetary CME. For some magnetotelluric station the availability of the electric field measurements allowed a direct comparison with the predicted geoelectric field.