From the Sun to the Earth: August 25, 2018 geomagnetic storm effects

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On August 25, 2018 the interplanetary counterpart of the August 20, 2018 Coronal Mass Ejection (CME) hit the Earth, giving rise to a strong geomagnetic storm. We present a description of the whole sequence of events from the Sun to the ground as well as a detailed analysis of the onserted effects on the Earth's environment by using a multi instrumental approach. We studied the ICME propagation in the interplanetary space up to the analysis of its effects in the magnetosphere, ionosphere and at ground. To accomplish this task, we used ground and space collected data, including data from CSES (China Seismo Electric Satellite), launched on February 11, 2018. We found a direct connection between the ICME impact point onto the magnetopause and the pattern of the Earth's polar electrojects. Using the Tsyganenko TS04 model prevision, we were able to correctly identify the principal magnetospheric current system activating during the different phases of the geomagnetic storm. Moreover, we analyzed the space-weather effects associated with the August 25, 2018 solar event in terms of evaluation geomagnetically induced currents (GIC) and idontification of possible GPS loss of lock. We found that, despite the strong geomagnetic storm, no loss of lock has been detected. On the contrary, the GIC hazard was found to be potentially more dangerous than other past, more powerful solar events, such as the St. Patrick geomagnetic storm, especially at latitudes higher than $60^\circ$ in the European sector.