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Solar wind ionic density variations related to M6+ global seismic activity between 2012 and 2018

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The Sun emits a continuous stream of electrically charged particles which is called "solar wind". The density and the velocity of this ionic flow is not constant but varies in relation to the electromagnetic phenomena that are produced on the solar surface. This flow propagates within the interplanetary medium reaching the planets and causing perturbations of their magnetosphere. In this work the authors analyzed the characteristics of the solar wind near Earth between 1 January 2012 and 31 December 2018.
The data relating to M6+ earthquakes were provided by the United States Geological Survey (USGS). The data on ion density used to realize the study are represented by: solar wind ion density variation detected by ACE (Advanced Composition Explorer) Satellite and DSCOVR (Deep Space Climate Observatory) Satellite, in orbit near the L1 Lagrange point, at 1.5 million of km from Earth, in direction of the Sun. To conduct the study, the authors have taken in consideration the variation of the solar wind protons density of three different energy fractions (ACE Satellite): differential proton flux 1060-1900 keV (p/cm2-sec-ster-MeV); differential proton flux 761-1220 keV (p/cm2-sec-ster-MeV); differential proton flux 310-580 keV (p/cm2-sec-ster-MeV); and proton density (cm-3) (DSCOVR Satellite). The results of the study showed that there is a close correlation between the variations in solar ion flux density and all potentially destructive (M6+) earthquakes that occurred on a global scale between 2012 and 2018: a total of 923 seismic events.