



Solar wind proton density variations that preceded the M6,1 earthquake occurred in New Caledonia on November 10, 2014

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This work analyzed the modulation of the solar wind proton density variation that preceded the M6,1 earthquake occurred in New Caledonia on November 10, 2014 at 10:04:21 UTC. The purpose of the study has been to verify the existence of a correlation between solar activity and the earthquake and for testing a method to be applied in the future also for the prediction of tsunamis. The ionic data used to realize the correlation study are represented by: solar wind ion density variation detected by ACE (Advanced Composition Explorer) Satellite, in orbit near the L1 Lagrange point, at 1.5 million of km from Earth, in direction of the Sun. The instrument used to perform the measurement of the solar wind ion density is the Electron, Proton, and Alpha Monitor (EPAM) instrument, equipped on the ACE Satellite. To conduct the study, the authors have taken in consideration the variation of the solar wind protons density that have these characteristics: 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 differential proton flux 115-195 keV (p/cm²-sec-ster-MeV). The sample data used to conduct the study refers the period going from 7 to 10 November 2014. The data on the M6,1 earthquake are provided in real time by the USGS (United States Geological Survey). The data analysis revealed that the M6,1 earthquake occurred in New Caledonia on November 10, 2014 at 10:04:21 UTC, was preceded by a solar coronal mass ejection (CME) that reached Earth at 19:31:04 UTC (\pm 6 hours, ISWA data) on November 9, 2014. The CME event produced an increase of solar wind ion density that preceded the earthquakes of about 14.5 hours.