Geophysical Research Abstracts
Vol. 15, EGU2013-2617, 2013
EGU General Assembly 2013

Variations of terrestrial geomagnetic activity correlated to M6+ global seismic activity

Gabriele Cataldi (1), Daniele Cataldi (2), and Valentino Straser (3)

(1) LTPA Observer Project, Radio Emissions Project, Albano Laziale (RM), Italy (ltpaobserverproject@gmail.com), (2) LTPA Observer Project, Radio Emissions Project, Lariano (RM), Italy (daniele77c@hotmail.it, daniele77c@gmail.com), (3) International Earthquake and Volcano Prediction Center, Orlando - Florida (USA),Terenzo (PR), Italy (vstraser@ievpc.org)

Variations of terrestrial geomagnetic activity correlated to M6+ global seismic activity

Gabriele Cataldi
LTPA Observer Project, Radio Emissions Project, Albano Laziale, Rome, (Italy) – (ltpaobserverproject@gmail.com)

Daniele Cataldi
LTPA Observer Project, Radio Emissions Project, Lariano, Rome, (Italy) – (daniele77c@hotmail.it – daniele77c@gmail.com)

Valentino Straser
International Earthquake and Volcano Prediction Center, Orlando – Florida (USA) – (vstraser@ievpc.org)

Abstract

From the surface of the Sun, as a result of a solar flare, are expelled a coronal mass (CME or Coronal Mass Ejection) that can be observed from the Earth through a coronagraph in white light. This ejected material can be compared to an electrically charged cloud (plasma) mainly composed of electrons, protons and other small quantities of heavier elements such as helium, oxygen and iron that run radially from the Sun along the lines of the solar magnetic field and pushing into interplanetary space. Sometimes the CME able to reach the Earth causing major disruptions of its magnetosphere: mashed in the region illuminated by the Sun and expanding in the region not illuminated. This interaction creates extensive disruption of the Earth's geomagnetic field that can be detected by a radio receiver tuned to the ELF band (Extreme Low Frequency 0-30 Hz). The Radio Emissions Project (scientific research project founded in February 2009 by Gabriele Cataldi and Daniele Cataldi), analyzing the change in the Earth's geomagnetic field through an induction magnetometer tuned between 0.001 and 5 Hz (bandwidth in which possible to observe the geomagnetic pulsations) was able to detect the existence of a close relationship between this geomagnetic perturbations and the global seismic activity M6+. During the arrival of the CME on Earth, in the Earth's geomagnetic field are generated sudden and intensive emissions that have a bandwidth including between 0 and 15 Hz, an average duration of 2-8 hours, that preceding of 0-12 hours M6+ earthquakes. Between 1 January 2012 and 31 December 2012, all M6+ earthquakes recorded on a global scale were preceded by this type of signals which, due to their characteristics, have been called "Seismic Geomagnetic Precursors" (S.G.P.).
The main feature of Seismic Geomagnetic Precursors is represented by the close relationship that they have with the solar activity. In fact, because the S.G.P. are geomagnetic emissions, their temporal modulation depends on solar activity: protons and electrons increase in the solar wind; increase of the electromagnetic emissions on Earth's magnetic poles; reducing of the magnetopause standoff distance; intense and sudden changes in the interplanetary magnetic field (IMF). The beginning of the geomagnetic disturbance that precedes the earthquake is activated by an protons and electrons density increase in the solar wind that can be monitored through telemetric data sent by satellite ACE (Advanced Composition Explorer) that currently operating in a Lissajous orbit near the Lagrange point "L1" (between the Sun and Earth, at a distance of approximately 1.5 million km from Earth).