



Preliminary report, between seismic swarms, the constant cycles of inflation/ deflation in some volcanic calderas in the world and the minimum and/or solar maximum years

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The global communication network and GPS satellites have enabled us to monitor for more than a decade, some of the more sensitive, well-known and highly urbanized volcanic areas around the world. The possibility of electromagnetic coupling between the dynamics of the Earth-Sun and major geophysical events is a topic of research. However the majority of researchers are orienting their research in one direction. They are attempting to demonstrate a significant EM coupling between the solar dynamics and terrestrial seismicity ignoring a possible relationship between solar dynamics and the dynamics inherent in volcanic calderas.

The scientific references are scarce, however, a study conducted by the Vesuvius Observatory of Naples, notes that the seismic activity on the volcano is closely related to changes in solar activity and the Earth's magnetic field. We decided to extend the study to many other volcanic calderas in the world in order to generalise the relationship between solar activity and caldera activity and/or deformation of the ground. The list of Northern Hemisphere volcanoes examined is as follows: Long Valley, Yellowstone, Three sisters, Kilauea Hawaii, Axial seamount (United States); Augustine (Alaska), Sakurajima (Japan); Hammarinn, Krisuvik; Askja (Iceland) and Campi Flegrei (Italy).

We note that the deformation of volcanoes recorded in GPS logs varies in long, slow geodynamic processes related to the two well-known time periods within the eleven-year cycle of solar magnetic activity: the solar minimum and maximum. We find that the years of minimum (maximum), are coincident with the years in which transition between a phase of deflation (inflation) occurs.

Additionally, the seismicity recorded in such areas reaches its peak in the years of solar minimum or maximum. However, the total number and magnitude of seismic events is greater during deep solar minima, than maxima, evidenced by increased seismic activity occurring between 2006 and 2010.

This research is only a preliminary study report. Further and more extensive research are needed, in order to formulate a precise hypothesis of the relationship between aspects and magnetic geophysical processes inherent in the restricted volcanic areas. Our aim is to develop a useful technique to connect together with others as part of a toolkit enabling significant prediction of parametric processes.