Electrode effect of the global tectonic activity in the conditions generated by the solar and lunar eclipses, in a sunspot cycle

Valentin Constantin Furnica
Institute of Geodynamics, Bucharest, Romania
e-mail: cvfurnica@gmail.com

The electrode effect of the global tectonic activity (Furnica 2002) establishes correlations between anomalous variations of signal measured as electrical potential differences between the electrodes of an electrical micropile and seismic activity on Earth, or from nearby observation point. Between 1 February 2006 and 12 October 2016, a transducer system (SLD2), consisting of three brass cylinders with equal masses and different sections L, N and R (Fig.1a), provided the electric potential difference $\Delta V(mV) = L-R$ by shorting the zero terminals of the two channels of low-pass filter (<10 Hz) input connected to the electrode N (Fig.1b). Initially, the electrodes have been submerged in 7 liters solution of NaCl in distilled water, which has evaporated completely after 1 to 2 years. Because of this, the bipolar anomaly from the beginning of chart it is difficult to interpret, although it was obtained under the definition of an electric cell.

Fig. 1 a) brass cylinders of electrodes: L - left, R - right and N - null; b) low pass filter (ULF) and the analog multimeter

The average of the 4 or 5 daily readings meter analog scale (Fig.1b) in Monday to Friday, was attributed Wednesday, in the 11 years of observation yielding 830 weekly averages (blue line in Fig.2). Also, the graph (Fig. 2) contains variations of temperature (brown line), times of lunar (LE) and solar (SE) eclipses and seismic events corresponding to M = 8.8 and 9.0 (red bars), or M = 8.0 and 8.2 (magenta).

Gray colored areas represent the current solar cycle, which began in January 2009 and whose maximum is defined by two peaks of monthly average, in October/November 2011 and February 2014 (Alvestad, 2016). According Svalgaard and Kamide 2013, Young 2014 and Alvestad 2016, between June 2012 and July 2013 there was reversal of the magnetic poles of the Sun, this time domain being bordered by two other intervals (colored yellow) of about six months, regarded as apparent reversal (December 2011- July 2012 and July 2013 - December 2013).

On the time axis, are highlighted three areas, colored cyan, in which eclipses of the Sun and the Moon form triplets. Considering the solar eclipse (SE) of triplet held in 10 June 2002, the one that will take place in conditions geometrical nearly identical in 21 June 2020, completes a Saros, i.e. a period of 18 years 11 days and 8 hours (L ' Observatoire de Paris, 2016; NASA, 2015). Of the five triplets, only one in summer 2011 contains sequence ES-EL-ES. The other four EL-ES-EL are symmetrically distributed, two of them appearing in the chart just two years left and right.

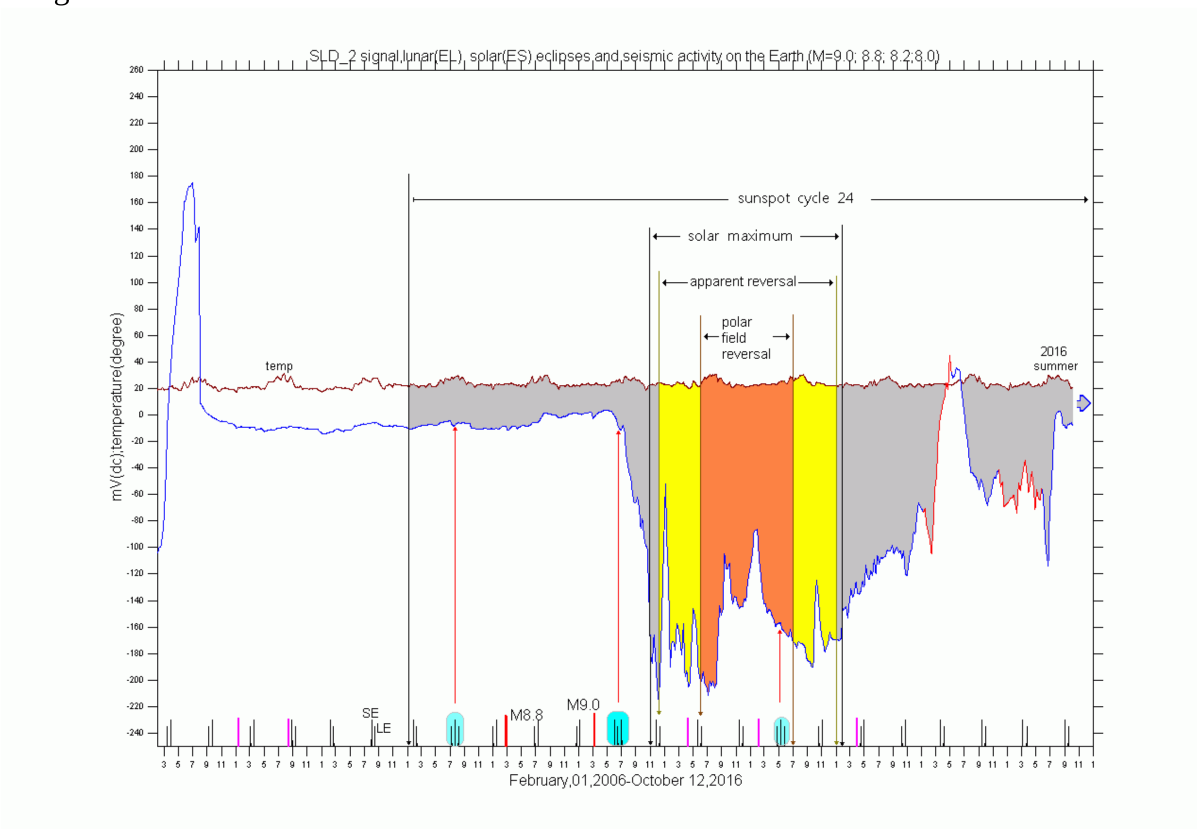

Fig. 2 SE – solar eclipse; LE – lunar eclipse

The set of all data presented in Figure 2 suggests that 11-year interval considered, there are two types of major influences on the Earth's crust: one, electromagnetic phenomena related to solar cycle 24 and another, gravitational, determined by a geometry close of the straight line, specific to the solar and lunar eclipses.

A solar cycle corresponds to a period of about 11 years, and electromagnetic effects are due to the number of sunspots and magnetic pole reversal, process in which the cancellation of magnetic fields corresponding to north and south poles cause disturbance in the heliospheric current sheet to great distances in the solar system (Phillips, 2001; Young, 2014). If the effects of gravity, the period of Saros (approximately 18 years), if centered on a triplet type ES-EL-ES, and it is near solar maximum, as in the case of cycle 24, could result sudden variations of state parameters. Here, values ΔV(mV) indicate a rapid increase in the negative, preceded by a M9.0 earthquake in Japan - 11 March 2011 (USGS, 2001 - 2012) and probably triggered by the triplet of eclipses in summer 2011.

For working hypothesis, according to which it is measured the electrode effect of the global tectonic activity, becomes particularly important similarity between the electrical signal measured and the average curve on the variation of the number of sunspot cycle 24 (Alvestad, 2016): both shows, on similar areas of maximum, two peaks separated by coincident tendencies within the timeframe in which the magnetic poles are reversed (Fig.2). For example: the apex 1 (-ΔV) (November 2011 - July 2012) corresponds to the top 1 of solar maximum (March 2012); apex 2 (-ΔV) (July 2013 - January 2014) corresponds to the top 2 of solar maximum (February 2014); positive tendency values (- ΔV) (July 2012 - February 2013) corresponds to the negative tendency in the solar maximum (April 2012 - April 2013). Extrapolating to the left, we see that the solar maximum (which corresponds to the maximum in negative ΔV values), there is a plateau of graph containing end-of branch 23 and 24 upward cycle. Right of solar and electric maxima, the signal ΔV appears to represent a "relaxation" of the Earth's crust, but with a possibly quantitative and qualitative change, because in the last two cold seasons, between 2014 and 2016, there was a new type of signal, transient, unprecedented in laboratory conditions, in the last 9 years (colored red portions of the signal SLD2, Fig. 2).

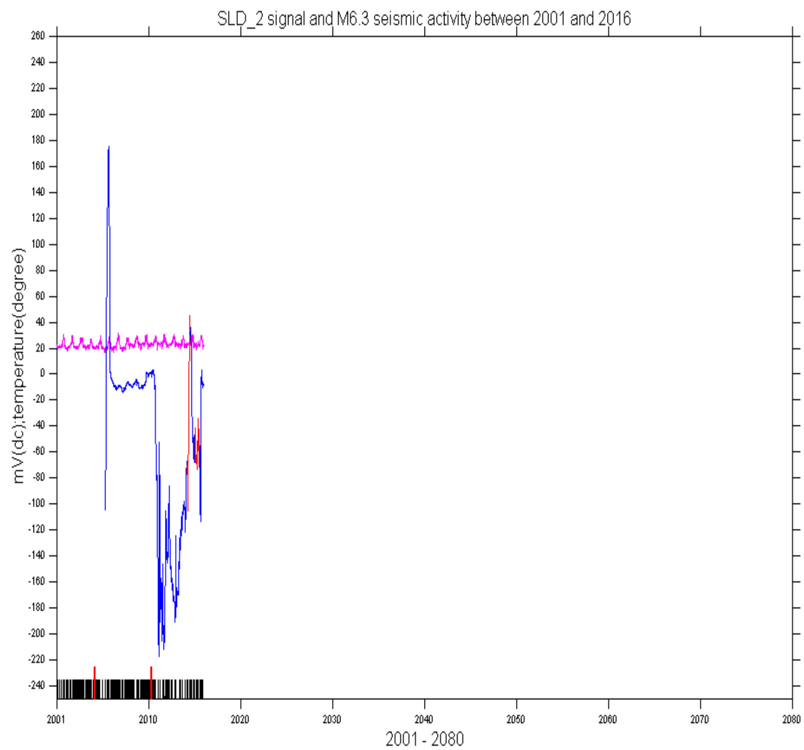

Fig. 3 red bars: M 9.0 Sumatra - 26.12.2016 (left) and M 9.0 Japan - 11.03.2011(right)

There is a tendency of grouping several events as the time scale is reduced, they gaining value in interpreting geophysical electrical signal variations and therefore, a value of geodynamic indicators. From this point of view, besides earthquake M8.8 - Chile, 27.02.2010, or M8.2 and M8.0 (magenta bars) shown in Fig.2, may be mentioned that of M = 7.5; 7.4; 6.8; 6.4; 6.3; 6.1; 6.0; 5.9 and 5.8 (USGS, 2001 - 2012, 2013; NCEDC, 2014 - 2016).

In Figure 3 you can see how, for a time scale corresponding to a period of 80 years, electrical signal is compressed and earthquakes of M9.0 (red bars), occurred in Sumatra (26.12.2004) and in Japan (11.03.2011), become the precursors for large variations in the electrical signal, the bipolar anomaly recorded in 2006 gaining a greater degree of trust. M6.3 seismic events of the period 2001 – 2016, represented by black vertical bars, tend to form areas of continuity, with separate areas of much lower frequency for earthquakes of this magnitude, the last situation corresponding to rapid variations of ΔV signal (mV) on the exaggerated time scale.

It follows a somewhat contradictory situation: major earthquakes around the globe precede processes, probably tectonic, which ulterior determine variations in the electrical fields that accompany the tectonic movements correlated with events of smaller magnitudes.

Conclusions

In a long time, the crust supports influences of the electromagnetic field's variations emitted by the Sun in 11-year cycles and the gravitational fields due to the relative position of celestial bodies (Sun, Moon, and Earth), groupings of eclipses of the Sun and the Moon being considered as depending on cycles of 18 years. In turn, the tectonic stress generates the electromagnetic fields throughout the spectrum, and the electrode effect of the global tectonic activity can be used to select the anomalous variations in electrical potential, like precursory for imminent earthquakes, but also the significant changes in the long-term tectonics of nearby.

A "paradox of major earthquakes" could be defined related to the results concerning M = 8.8 and 9.0, if interest lies in recording electric precursors. On found that a major earthquake yields to large changes in the electrical signal on long intervals, of the order of several years, in which the anomalies of electrical signal may be than highlighted in relation to the occurrence of smaller earthquakes (e.g. M6.3).

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