



Comparing the Andean volcano–seismic events to secular PM and TPW

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A volcano-seismic correlation was for a long time suspected to occur for the Pacific margin events of South America (Scalera 2007, 2008). After 2006, the Smithsonian Institution has improved the catalogue adding the new eruptions for the 2000-2010 interval, but also adding a 60% of new entries in the list of the Andean volcanoes. The occurrence of the Chilean Maule earthquake of 27 February 2010 ($M=8.8$) has been the occasion to rework all the data. Passing from the older volcano-seismic coincidence events – 1868 – to the 2010 one, it is clear the trend of an enhanced rate of eruptions before the main seismic event.

The 1868 event – The date of the eruptions may be can be confused with the observation date, displacing the event many months ahead and possibly one or more years ahead.

The 1906 event – This event is pair of great earthquakes (Ecuador, January 31; $M=8.8$; Lat=01.0N, Lon=81.5W; Chile, August 16; $M=8.4$; Lat=33.0S, Lon=72.0W) that occurred separated by very long distance (≈ 3500 km). Only the volcanic southern district appears to have a peak of eruptions correlated to the earthquakes. The maximum is one year after the seismic event but the growing of the eruptions rate starts in the same year of the quake.

The 1960 event – The earthquake occurred (1960, Chile, Lat=38.0S, Lon=72.3W, $M=9.5$) in the times of more modern scientific instrumentations and surveying facilities. The maximum eruption rate is in the same year and the growing of the rate starts before the quake occurrence.

The 2010 event – All the onset date of the eruptive events are known thanks to improvements of satellite, aeronautical and land remote digital surveillance methods. The rate of eruptions in the northern and southern volcanic district increased from one-two erup/year to five in 2009. The northern volcanic district was active in the interval 2007-2009, while the central district does not contribute to the volcano-seismic correlation event. It is then well grounded the statement of a precursory behavior of the northern and southern district volcanic activity in this case.

In the asymmetrical expanding Earth schema an emplacement of mass in the Southern Hemisphere on the Nazca region (Scalera, 2006) should be hypothesized. In this interpretation the TPW path – with its stasis at 50 Myr and inversion of sense – is linked to the paleogeographical position of the region of maximum planetary expansion, and may be that the oscillations and other features of the PM path could be correlated to the peculiar volcano-seismic events of the Andes, linking surface to deep processes. Comparing the secular PM (from 1846 to 2009) and the time of occurrence of the volcano-seismic events of correlations, it is possible to search for the further global geodynamical clue of a possible synchronicity:

i) Only three volcano-seismic events can be correlated to the series of PM data 1846-2009, namely the events of 1906, 1960 and 2010.

ii) The PM data preceding 1900 are not homogeneous with the 1900-2009 ones.

iii) The events of 1960 and 2010 occur about 12 years after a five-years window of ‘stasis’ of the secular PM. Albeit the data are not against the same mutual pattern between the event of 1906 and the PM data of the last decade of the XIX century, the non-homogeneity of data do not allow a positive conclusion.

iv) To ascertain the reality of this further intriguing correlation (or synchronism with the Markowitz oscillation of PM) a greater amount of volcano-seismic events is needed.

v) The next expected volcano-seismic correlation will happen within 40-50 years.

References

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