



Letters to Editor

“El Niño” is a tectonically driven meteorological event?

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El Niño is certainly one of the most important meteorological event and has been studied from a meteorological point of view by researchers of many leading scientific societies in the world. The search for his origin was part of the Tropical Ocean Global Atmosphere Program under which the China had 2 research cruises at the end of the years 1980. During a half-score of years later, France, Australia, Chile, Peru and other countries studied El Niño working together on the TOGA Program under the World Climate Research program. As far as I know, no widely accepted explanation for the provenance of thermal energy necessary to overheat the surface of the ocean in the area of the Polynesian islands seems to have been reached up to day and in my opinion, instead of looking for the origin of the phenomenon above the ocean should be more fruitful to look below it. In 1986, considering the general increase of the temperature of the oceans and the rise of their level in the last century, G. Mc Allister posed, in a letter to Geotimes, a new theory: “Heath from volcanic activity is the main factor and the greenhouse effect will make the problem worse” To explain the observed increase of the temperature of the oceans, two are the possibilities: the green house effect and an increased heath flux from the mantle of the Earth. In Mc Allister’ opinion the greenhouse effect is real but he is not sure it is the only factor because we do not know how many submarine volcanoes are there. It is difficult to count them and more difficult to prove that their number and their activity are increasing. I know no other suggestion to correlate climate modifications with the heath flux from the mantel of the Earth and this point of view seems to me to be worthy of attention. More recently many scientists are inclined to connect the origin of El Niño with submarine volcanoes but in a rather approximate and vague way. If we consider the area where El Niño develops we realize that it extends over portions of two of the tectonic plates floating on the mantle of the earth: the Nazca, on which South America stands, and the Pacific plate to the West. These plates are separated by a spreading boundary along which the movement is very rapid. In correspondence of the Tropic of Capricorn the mean spreading velocity is the highest known in the world reaching 8 millimetres/year. This velocity is a mean velocity and it is conceivable that the process may actually be characterized by periods of fast or extremely fast spreading followed by intervals of very reduced spreading or of no movement at all. This means irregularly pulsating emissions of different volumes of lavas as it happens in many volcanoes we may easily control all over the world and i am convinced that it is a nonsense trying to detect a measurable periodicity in the length variation of the intervals between two events. The spreading movement necessarily occurs along a fissure which length must be of kilometres, consequently the volume of emitted lava may be very large. In the portion of southern Pacific between South America and Polynesia, not far from Pasqua island, is present in the bottom of the ocean the segment of spreading boundary between tectonic plates where the movement is the faster we know and west of Chile an oceanic current moves the water from the bottom towards the Polynesian islands. In such a condition, every outflow of melted material produced by each spreading event of the oceanic bottom must produce an important heath transfers to the local bottom water which in turn is transported to the surface towards Polynesia from where the warm current of El Niño moves to Ecuador.

The quantity of heath supplied to the water depends on the width of spreading and different velocities explain the different intensity which characterize the meteorological phenomenon in different times.

In conclusion, the meteorological phenomenon of El Niño is produced by the tectonic movement of two crustal plates floating over the mantle of the Earth.

If that is how things are, from a practical point of view, we will actually forecast with certitude the origin of El Niño if we have the possibility of putting under sharp control the spreading velocity of Pacific and Nazca plates: when a movement is detected, a new Niño is coming.

Mc Allister G., 1986. Volcanoes heat oceans? Letters to Geotimes, p. 2.