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Correlation between seismicity and episodes of psychotic disorders

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Several investigations have shown the influence of environmental variations on human health, and the scientific research demonstrated that specific materials or processes contribute or even constitute the main agent for various kinds of diseases. Seismic activity is known to be one of the most catastrophic physical phenomena, with hundreds of thousands deaths in some cases (China / 2008, Italy / 2009, Chile / 2010, Haiti / 2010). The novel point of this study is that we focus on previously not explored risks for the human health related with seismic activity. It is known that several days before an earthquake (EQ) several physical processes are in progress, for instance radon emanation, electromagnetic emissions at various frequency bands, magnetic field variations etc, which are observed in the atmosphere. Since some of these processes, i.e. some electromagnetic emissions or radon emanation, have been connected with biological adverse effects, we examined the possible relation between seismic activity and psychotic disorders. We compared the seismic activity (EQs with magnitude M>2.5) in a geographical rectangular area including the island of Crete (21o-29oE, 32.5o-38oN), a region at the boundaries of Eurasian and African tectonic plates, and admissions to the Psychiatric Clinic of the University of Crete, during the years 2008-2010. Our main finding is a positive correlation between the distributions of the monthly frequency of earthquakes NE / T and the psychotic disorders NP / T; a cross-correlation coefficient was evaluated to be as high as 0.66 for ΔT=0 (2009-2010). A maximum in both numbers NE / T and NP / T was observed in August 2010 (NE / T = 324; NP / T = 70). Another finding is that the yearly average number of serious (weak) disorders increases (decreases) with decreasing ratio n of the relative number of greater EQs (M>3 compared with M>2.5). We suggest that seismic activity was a major factor influencing the frequency of admissions of psychotic disorders in Crete in the time period examined. A research plan is in process in order to distinguish which of the main EQ-related physical variations may be associated with adverse effects on the human nervous system, i..e. quasi-electrostatic emissions from the EQ epicenter, local geomagnetic fluctuations, and atmospheric electric field variations, although other processes are possible. Further confirmation of our findings in other highly seismic regions on the globe is needed. Such findings may help us to identify novel factors triggering psychotic relapses and may help to establish new preventive strategies.