



## **The possibility of earthquake forecasting: learning from nature.**

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The technology is described, which helps to use the physical anomalies registered before earthquakes as precursors for the short-term earthquake forecast. It is based on the physical model demonstrating the ways how anomalies are generated and affect each other. Then synergy of these revealed processes creates the integrated multidimensional reliable precursor as a means for making the final conclusion on impending earthquake. This multidimensionality is provided by the MSNA approach consolidating the diverse set of ground and satellite observations into the system of indicators for the forecast realization. At the first glance it may seem that our approach is purely deterministic. But it is not so. Constructing of multidimensional integrated precursor is a kind of “time arrow” search that characteristic to synergistic view on the complex systems approaching to the critical point. The majority of precursors we use are characteristic to the latest stage of the seismic cycle when the process is irreversible. We can say that we are moving in the direction which was recently formed in the Seismic Hazard studies: from probabilistic seismic hazard assessment (PSHA) to neodeterministic seismic hazard assessment (NDSHA) [Zuccolo et al., 2011; Panza et al., 2012].

The problem of earthquake triggers and their relation with precursors is considered, as well as revealed recently phenomena as earthquake retarders which may lead to delay of predicted earthquake or annihilate it.

The majority of processes considered in our model are similar to well known natural processes where they are more explicit, such as air ionization by galactic cosmic rays, nucleation and cloud formation, Global Electric Circuit modification.

Panza, G. F., C. La Mura, A. Peresan, F. Romanelli, and F. Vaccari (2012), Seismic hazard scenarios as preventive tools for a disaster resilient society, *Adv. Geophys.*, 53, 93–165, doi:10.1016/B978-0-12-380938-4.00003-3.

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Zuccolo E., Vaccari F., Peresan A., Panza G. F., Neo-Deterministic and Probabilistic Seismic Hazard Assessments: a Comparison over the Italian Territory, *Pure and Applied Geophysics*, 168, 69-83, 2011