

## Relationship between social and natural disasters

VIKULINA, Marina<sup>1\*</sup> ; VIKULIN, Alexander<sup>2</sup> ; SEMENETS, Nikolai<sup>3</sup>

<sup>1</sup>Research scientist, Faculty of Geography, Lomonosov Moscow State University, Russia, <sup>2</sup>Senior Research Fellow, Institute of Volcanology and Seismology, Russia, <sup>3</sup>Acting general director, Research and Production Company "EKOS", Moscow, Russia

The problem of reducing the damage caused by geodynamic and social disasters is a high priority and urgent task facing the humanity. The vivid examples of the earthquake in Japan in March 2011 that generated a new kind of threat ? the radiation pollution, and the events in the Arabic world that began in the same year, are dramatic evidences. By the middle of this century, the damage from such disastrous events is supposed to exceed the combined GDP of all countries of the world. The authors have developed the first database to include the largest geodynamic and social phenomena that occurred on Earth before 2005. We suggest the following phenomenological model based on the database (uniform with respect to the quantitative classification). All disasters are classified by size using a single logarithmic scale suggested by Rodkin and Shebalin in 1993. The base consists of 2000 disasters. The following phenomenological model is proposed: 1. The scale of disasters does not decrease with time. (Earthquakes in China in 1556 and 1976; the tsunami after the Sumatra earthquake in 2004, which can be compared in regards to the level of consequences only with the World Flood or a series of floods that occurred approximately 13000 years BP). 2. There were a minimal number of disasters in the 15th century; during which there were not a single disaster with  $J = I$  and  $II$ ; from that time the number of such disasters gradually increases; in the 20th century there were 20. 3. The number of disasters is characterized by cycles, which are a few thousand years long; the available longterm measurements confirm this (for example, the overflow of the Nile observed over more than 5000 years or deformations of the Earth surface in the last few thousand years based on the geodynamic, seismotectonic, and paleoseismic data). 4. Natural and social disasters together are distributed uniformly in time, while only natural and only social disasters are distributed nonuniformly, i.e. disasters group.

5. The proportion of the social disasters has a tendency to increase in time, which confirms the viewpoint of V.I. Vernadskii about the constantly increasing role of humans and society in the noosphere. It was shown that natural and social disasters are interrelated. The Earth from the point of view of the disaster theory evolves according to the definite laws of the unique bio-socio-geodynamics. The investigation and understanding of the nature of this mechanism that "mixes the disasters" will allow us in the future to formulate a scientific hypothesis and/or a law on the basis of the phenomenological model that we suggest in this work and use it in the system of expert global process management. In the aspects of modern methods of studying of the global disasters, the authors suggest an approach to understanding global disasters based on modern data. The global disaster is an event damage from which cannot be liquidated by the joint resource. Irreversible process of death of a modern civilization can become a consequence of a global disaster.

Keywords: geodynamics, society, magnitude of disaster, interaction of disasters, impact of society