How Risky is Our Risk Management: Dynamical Networks Approach

J. Zvelebil (1), M. Nechyba (1) and V. Vilimek (2)

(1) Geo-tools NGO, Zdiby, Czech Republic (info@geo-tools.cz), (2) Faculty of Science,
Charles University, Prague, Czech Republic

There is a high need to start fair discussion about tactics to be adopted in geo-risk management (GRM). To be effective, it has to be preceded by a wide dissemination of nonlinear ideas to public and, especially, to decision makers in charge.

We all agree in the holistic strategy and synergy to tackle with our complex world. But there is a lesser agreement how to transform that strategy into tactics, i.e. in measures really useful in our every-day life.

Scientists are mostly aware of rather strange nature of nonlinear paradigm implications, and they have already started to imply new methods from the tool-box of nonlinear science, to gain insight into complex interplays of geodynamical systems. Unfortunately, there is a serious lack of such attitude to interplays of geo-disasters and social-economical systems among decision-makers at all levels. They especially lack network thinking ability derived from knowledge of Dynamical Network Theory.

The tactics of vertical, hierarchical-logical tree of GRM can be found in nearly all encouragements or even mandatory requirements which go from international entities and governments to the lower, daily-life levels. Functionality of such GRM was treated in comparison with general requests of good functionality of any dynamical management: a) Effective information transfer & sharing; b) Low vulnerability, high resiliency - i.e. high damage tolerance; c) Sustainable development of system to be non-static to expand itself with growing number of nodes (entities involved), and networking itself to dynamically respond to changing demands due to changes in society and environment; d) Develop itself into System of Collective Intelligence to enable

decision support and reaching consent within large stakeholder groups of different interests by clarifying complex issues & by providing understanding of causes of their interest conflicts. Many case-histories support our conclusion, all vertically as logical tree organized systems, including the current GRM, show low efficiency and damage/error robustness, especially at the daily-life level.

To satisfy basic conditions for development of robust, dynamically expanding, self-organizing & self-sustaining GRM network, high expectance is given to an implementation of scale-free network of the 2nd type of dynamical organization based on bottom-up organizing activity and enabling horizontal information flow.

Concluding: the top-down tactic is useful to provide us with the tools for methodically equal estimations of risk conditions in different parts of World based on interoperability of all standardized databases on one hand and on the very lowest level a rescue team work. But between these two levels there is vast realm of nonlinearity – so called "ant country" with its self-organizing, out-of-equilibrium systems, emergent phenomena and deterministic chaos.

Now, time is coming to delimit borders of that country and to find equilibrium between the current and the new organizing network which is already coming into play.