RISK PERCEPTION AS THE QUANTITATIVE PARAMETER OF ETHICS AND RESPONSIBILITY IN DISASTER STUDY

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Intensity of impacts of natural disasters is increasing with climate and ecological changes spread. Frequency of disasters is increasing, and recurrence of catastrophes characterizing by essential spatial heterogeneity. Distribution of losses is fundamentally non-linear and reflects complex interrelation of natural, social and environmental factor in the changing world on multi scale range. We faced with new types of risks, which require a comprehensive security concept.

Modern understanding of complex security, and complex risk management require analysis of all natural and social phenomena, involvement of all available data, constructing of advanced analytical tools, and transformation of our perception of risk and security issues.

Traditional deterministic models used for risk analysis are difficult applicable for analysis of social issues, as well as for analysis of multi scale multi-physics phenomena quantification. Also parametric methods are not absolutely effective because the system analyzed is essentially non-ergodic. The stochastic models of risk analysis are applicable for quantitative analysis of human behavior and risk perception.

In framework of risk analysis models the risk perception issues were described. Risk is presented as the superposition of distribution ($f(x,y)$) and damage functions ($p(x,y)$): $P \rightarrow \sum_{x,y} f(x,y)p(x,y)$. As it was shown risk perception essentially influents to the damage function.

Basing on the prospect theory and decision making under uncertainty on cognitive bias and handling of risk, modification of damage function is proposed: $p(x,y|\alpha(t))$. Modified damage function includes an awareness function $\alpha(t)$, which is the system of risk perception function (r_p) and function of education and log-term experience (c) as: $\alpha(t) \rightarrow (c - r_p)$.

Education function $c(t)$ describes the trend of education and experience. Risk perception function r_p reflects security concept of human behavior, is the basis for prediction of socio-economic and socio-ecological processes. Also there is important positive feedback of risk perception function to distribution function. Risk perception is essentially depends of short-term recent events impact in multi agent media. This is managed function.

The generalized view of awareness function is proposed: $\alpha(t) = \sum_i c - r_p^i$. Using this form separate parameters has been calculated. For example, risk perception function is about 15-55% of awareness function depends of education, age and social status of people. Also it was estimated that fraction of awareness function in damage function, and so in function of risk is about 15-20%.

It means that no less than 8-12% of direct losses depend of short-term responsible behavior of "information agents": social activity of experts, scientists, correct discussions on ethical issues in geo-sciences and media.

Other 6-9% of losses are connected with level of public and professional education. This area is also should be field of responsibility of geo-scientists.