



Algorithm of Calculation of Individual and Social Risk from Hazardous Natural Processes based on The Danger's Degree Map and Databases

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This study represents procedure of risk's calculation. It is based on two sources: 1) the danger's degree map of natural processes and 2) the database about their consequences (look the other our abstract).

First, we define the number of inhabitants subject to influence of hazardous process of determined category of danger (N_H), all over the country. This is a sum of inhabitants of all taxons ($i = m_h$) the danger's degree map, with a process h the k category(h_k). We are taking into account a degree of affect (A_{hi}) of taxon's territory by the process (data from the map).

The database stores statistics about manifestations of natural hazards in territory of the country for last 20 years: quantity of died – n_h^d , injured – n_h^t , and had material loss – n_h^w in all events of process h_k . Thus we can obtain the average of casualties from natural hazards in a year – $\bar{n}_h^{l(t,w)}$

Further we define probability for a person to suffer from effect of process h_k we dividing the average of casualties for a year into total number of inhabitants in subject territory (N_H). We accept that the individual risk to suffer from natural hazard

$$Ri_h = P_{hi} \times F_h, \quad (1)$$

where F_h – long-term repeatability of process h_k , p.un./year (data from map).

By definition, the individual risk – the characteristic related to concrete or typical individual.

The potential individual risk from all five hazardous processes in the taxon is equal to the sum of potential individual risks from each process (according to categories of their danger):

The collective or social risk (by A.L. Ragozin's definition) – expected quantity of casualties on a certain site of territory as a result of hazardous natural processes for the certain period of time. The social risk is the characteristic of concrete territorial unit.

The social risk (Rs) is calculated as product of individual risk and population of the taxon,

$$Rs = Ri \times N_i, \quad (2)$$

expressed in people/year on area unit.

It is more convenient to use specific value of social risk for creation of a map of social risk which is calculated as

$$rs = Rs / S_i, \quad (3)$$

where S_i – territory of the i taxon (sq. km).