

# TOXICITY AS A BIOGEOCHEMICAL PROBLEM

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# Background to the problem

1. The phenomenon of toxicity in its current understanding could have manifested **only as a result of a deliberate disturbance of the closed self-regulating systems** which have been formed and existed throughout the history of the biosphere.
2. **All chemical elements** are the constant components of the environment and the sphere of formation of living matter, that is why they are part of it and **are objectively necessary for the existence of life.**
3. Now the absolutely dominant approach to solving the toxicity problem is inductive-empirical. However, this does not mean that the problem has no **deductive solution** which **makes it possible to create a universal algorithm** that can provide simultaneous solution of all tasks of this class without loss of accuracy and detail.

# Proposed approach to the problem (general solution)

A deductive solution can be found basing on the theoretical statements of biogeochemistry and geochemical ecology.

1. Objectively *toxic elements or compounds* existed neither in the initial biosphere nor in modern noosphere, **there exist only toxic concentrations of them.**
2. **Diseases** of a geochemical nature can be caused not only by the excess doses of chemical elements or substances but **may also result from an artificial deficiency initiated by strict following the prescriptions of maximum permissible concentration (MPC).**
3. The **final toxic impact** on living organisms is determined by **specificity of spatial interference of geochemical fields of natural and technogenic elements.**
4. The proposed approach allows creating a **universal algorithm** for assessing the ecological and geochemical quality of the territory which can be reduced to fixation of the difference between the apparent ideal (natural) and the observed (present) state of the geochemical environment.



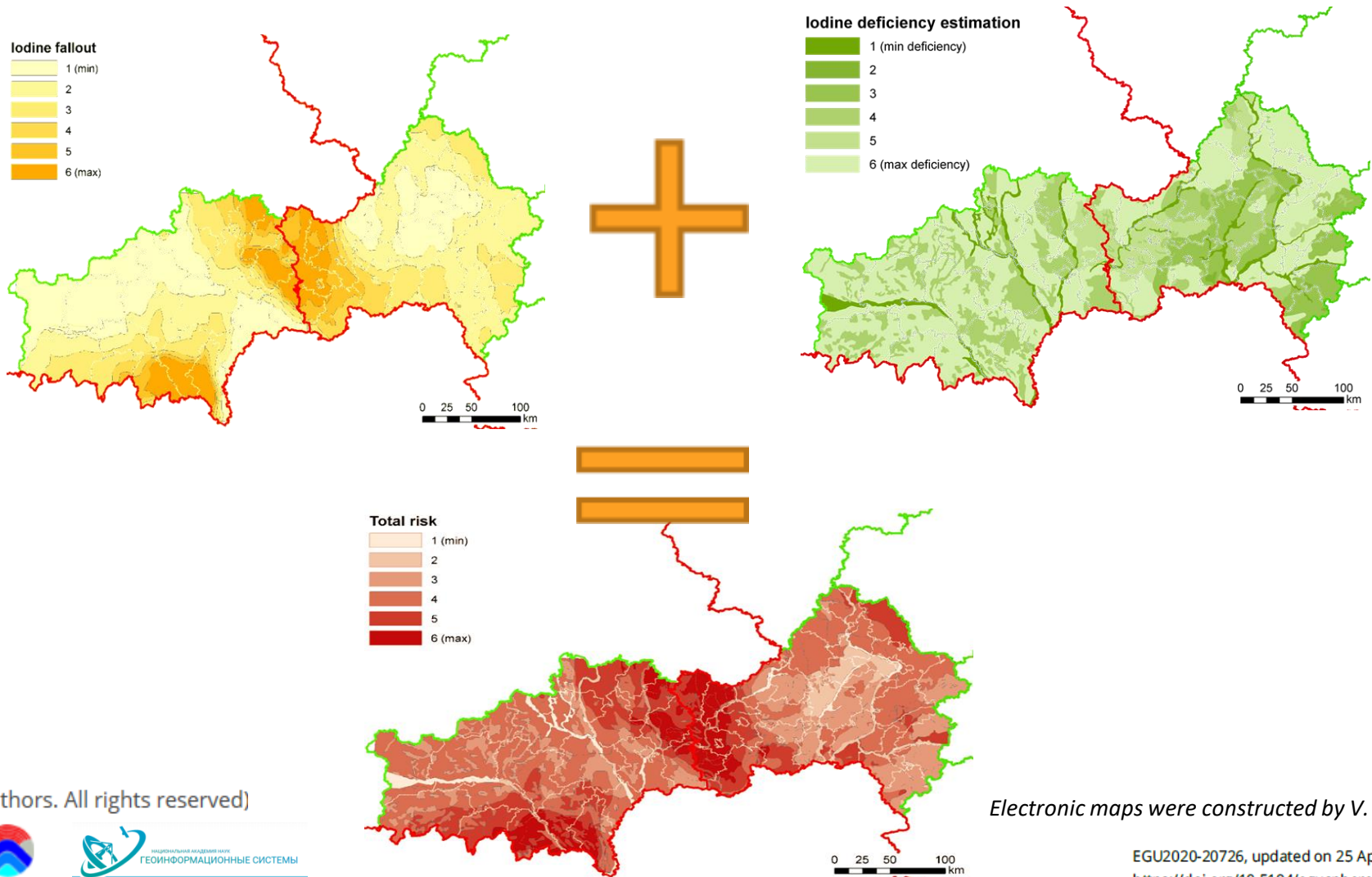
# Methodical approach to the problem

To solve the problem it is necessary to:

- accurately determine the quantitative parameters of the natural geochemical background (optimum) for each existing species;
- develop a methodology that allows accurate fixation of the difference between the optimal and observed geochemical state of the environment;
- implement the technology of creating synthetic maps characterizing the likelihood of specific biological reactions (risks) resulting from a prolonged stay of organisms within a particularly controlled territory.

# Practical testing of the proposed approach

A unique opportunity to test the proposed approach has appeared after the Chernobyl disaster, when the geochemical field of stable  $^{127}\text{I}$  has been shortly overlain by the technogenic field of the radioactive isotope  $^{131}\text{I}$ .



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Electronic maps were constructed by V. Baranchukov

# CONCLUSION

The problem of toxicity can be solved on the basis of the theoretical principles of biogeochemistry and geochemical ecology, which in turn opens the way to solving the problem of minimizing the consequences of existing endemic diseases of a geochemical nature.

The application of this approach allows creation of specialized decision-making systems for the safe organization of territories, the formation of a strategy for environmental and geochemical regulation and the prevention of microelementoses.

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***Thank you for the attention!***