# WHETHER WILL THE ATLAS OF CHERNOBYL ACCIDENT BE?

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**Abstract**

Sinister black could caused by the technogenic nuclear Chernobyl accident, the greatest one in the history of mankind, has been spread for thousands of kilometers. The most countries of Europe were exposed to radioactive contamination. The elimination of the accident consequences has been carried out by the specialists from the different fields of knowledge among those the cartographers were also. On basis of the numerous investigations it was making the significant inventory of the maps on radioactive contamination of the areas and countermeasures against the accident at the Chernobyl nuclear power plant. The paper is devoted to substantiation of necessity to compile the Atlas under the consolidation of the European countries and their financial support. The scientifical and methodical aspects for the development of the Atlas are discussed. The subjects and structure for the Atlas of the Chernobyl accident are proposed.

## Significance of maps for the accident elimination

The accident at the Chernobyl nuclear power plant in 1986 has shocked the whole word. In mankind history the immense technogenic nuclear disaster was happened. According to the estimation the radioactive contamination as a result of the large discharge of chemical radioactive elements has covered the vast and populous areas of three countries from the Union of Independent States, i.e. Byelarus, Russia, and Ukraine, as well as the areas of some other countries disposed at large distance from the epicenter of explosion, but exposed to contamination owing to the atmospheric transfer of the radioactive clouds. Thus the radioactive clouds "put a cover on" not large surface of Austria, Poland, Turkey, Sweden, and a number of other European states.

Disaster consequences of the Chernobyl accident are investigated by the scientists from the different fields in a lot of countries. Technical, geological, social, and economical aspects of the disaster are analyzed and studied in detail. Actual assistance was given by the emergency eliminating when the maps of radioactive contamination had the great significance. By May-June 1986 the chemical surveys performed by the different services have enable to map the main sources of area contamination. Generally for this purpose it was used such scale ranks for the topographic maps as 1:10000; 1:25000; 1:50000; 1:100000.

The topographic maps served as the blank general geographical bases. On those maps it was shown the contaminated areas affected by radioactive isotopes of cesium, strontium, iodine. As a rule the contaminated areas on the maps are grouped into 3 and/or 4 categories according to the amount of radioactive fallout. The first forbidden maps on radioactive contamination over the territory of European part of former USSR which became free from all restrictions by 1989 have widely been acceptable owing to the articles in a number of central newspapers. Those maps had not only vast information, but also scientific and practical importance. They were used to give the directives for countermeasures issued by the government structures for the military and civil services during the decontaminating of the new roads. In 1989 the airborne and ground surveys were repeated and there

are nothing considerable variations of the outlines marked the contamination density on the area. This is an evidence of the high accuracy of radioactive contamination maps compiled in 1986.

As the investigations on the consequences of radiological impact were increasing the subject maps were expending too. So it should be noted the original development to map the contamination proposed by a number of the Institute from National Academy of Sciences of Ukraine: Institute of Cybernetics, Institute of Geological Sciences, Institute of Geography, Center of Aerospace Research of the Earth [1, 4, 5].

The problems connected with the Chernobyl accident and radiological impact for the vast areas remain the most important at present [2]. In our point of view the more complete and real picture of hazard effects and emergency measures may be obtained by means of the forming of systems as the image-sign models in the form of map series or atlas. It may completely characterized with the aim of maps both hazard impact of radioactive contamination on the environment, population, animals and reflects the measure arrangement concerned the improvement of the inhabited surroundings for the people living in the contaminated regions.

**International co-operation in the making of Atlas**

One from the first who has mentioned about the making of the Chernobyl accident Atlas was A.Izrael' [3]. He has spoken his mind for detailed "enlargement of geography" of the research and elaboration of contaminated sources effected on the environment in the European part of former USSR. The creation of Atlas is essential problem for the most European countries exposed to radioactivity. In order to solve this problem it is insufficient the efforts from some alone Department, Institute or the State. Surely Byelarus, Russia, and Ukraine are interested in this first of all since they have affected the accident impact to a considerable extent. Taking into account the economical difficulties in these countries the making of such Atlas seems impossible. To find a way out of this difficulty may the consolidation of the scientists from a lot of the countries of the Europe. Essential assistance in the making of Atlas may be rendered by the International Financial Program or the Grant towards the development and implementation of the works.

It must be attached the status of the International Program to the creation of the Chernobyl accident Atlas with the IAEA as a Chief Coordinator. Atlas may be published in a few languages, e.g. English, French, Russian, for the potential users from numerous countries and to defray expenses.

**Program of works**

To draw up the Program and unified methodological principles on the making of Atlas it's need the organizing of the Co-ordinate Council with collaboration among all interested parties.

Co-ordinate Council will be solved the following problems:
- coordination of all works in the making of Atlas;
- finance of works among the states;
- development of Program and structure of Atlas;
- listing of the organizations-participants;
- assessment of the data representation for the mapping;
- elaboration of subjects, amount, volume, and scale series of the maps;
- choice of the general geographical blanks for the maps;
- substantiation of the printing aspects in the making of Atlas.

The size of the present article doesn't allow to considered other very important for the cartographing questions, e.g. a distribution, choice of the general geographical blanks, a scale series for the maps, the ways of cartographic representation of information, etc. Therefore, the structure of the Chernobyl accident Atlas, as an example, is given to the end of this article.

**Structure of Atlas**

In our opinion the Atlas must be making concerned to the following subject sections.

Section 1. Maps of radioactive contamination within the 30-km zone (10 days of atomic blasé).
- 1.1. Maps of radioactive contamination in the first day after accident (cesium, strontium, plutonium, iodine).
- 1.2.-1.10. Maps of radioactive contamination for 2-nd -10th days after the accident (cesium, strontium, plutonium, iodine).

Section 2. Maps of radioactive contamination for Byelarus.
- 2.1. General map of radioactive contamination.
- 2.2.-2.7. Maps of radioactivity levels for the districts (cesium, strontium).

Section 3. Maps of radioactive contamination for Russia.
- 3.1. General map of radioactive contamination.
- 3.2.-3.6. Maps of radioactivity levels for the districts (cesium, strontium).

Section 4. Maps of radioactive contamination for Ukraine.
- 4.1. General map of radioactive contamination.
- 4.2.-4.22. Maps of radioactivity levels for the districts.

Section 5. Maps of radioactive contamination for the countries of the West Europe and Asia.
- 5.1. Maps of radioactive contamination (according to certain country).
- 5.2. Maps of concentration for radioisotopes in milk and meat (according to certain country).
- 5.3. Maps of land losses for the cultivation.

Section 6. Medicine-ecological maps of the accident consequences (according to certain country).

Section 7. Counter measures concerned the radioactivity level decreasing.
- 7.1. Maps of soil liming.
- 7.2. Maps of application of manure and artificial fertilizers into the soils.
- 7.3. Maps of application of the ground minerals such as dolomite, zeolite, sodium humate, sapropel.
- 7.4. Maps of the transportation of minerals during the accident elimination (lead, boron, dolomite, sand, clay).
- 7.5. Maps of development of cropping regional systems (including the soil protective technologies on the crop cultivation).
- 7.6. Maps of soil and agricultural machinery decontaminate treatment.
- 7.7. Maps of optimum periodicity for the agricultural land return to the crop rotation.
- 7.8.-7.12. Maps of dynamics and principle relations for the radionuclide migration on the meadows, pastures, under the crop rotation conditions.
- 7.13. Maps of dynamics for radionuclides withdrawal from the human and animal organisms.

Section 8. Application of airspace data to solve the geoecological problems.
- 8.1. Maps of ecological state of water basins.
- 8.2. Maps of subsurface water levels.
- 8.3. Maps of the landscapes contaminated by heavy metals.
- 8.4. Maps of estimation and predicting concerned the radionuclides influence to the vegetation.

Section 9. Maps of social and economical after-effects of the Chernobyl accident.

9.1. Maps of population resettlement from the districts under gone the radioactive contamination.
9.2. Maps of the new settlements appeared after the accident.

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