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ECOLOGICAL MONITORING OF ARID ZONES OF KAZAKHSTAN

Environmental problems capture practically all natural zones of Kazakhstan, but especially brightly they were showed in arid territories which concern the Western, Central and Southern Kazakhstan. In the Western Kazakhstan ecological conditions are complicated by workings out of oil fields and gas. The soil cover, underground waters, the organic world is basically influenced. The increased pollution of atmosphere which is saturated with harmful emissions of a petroleum industry is observed. They drop out on a terrestrial surface with precipitations, polluting all natural components. Depth of infiltration of oil in soil reaches 1 m. Infiltration of oil in soil leads to development of the processes, which destroy soil structure and promoting formation of saline soils (solonchaks). Pollution of a soil cover influences on the ability of self-restoration of vegetative communities. The raising of level of Caspian sea endangers of flooding the oil deposits at northern and northeast coasts. The 43 deposits get to a zone of probable flooding, from which 32 - in Atyrau and 11 - in Mangistau areas with the general geological resources of oil over 5 billion tons. The largest deposits - Tengizsky, Royal, Kalamkas, Karazhanbas, and Northern Buzachi are included. About 20 deposits, which are located in Atyrau area, are already have undergone by sea influence. Among flooded – Armand deposits, located on peninsula of Buzachi, Sea, Coastal, Deserted, Southwest, Tazhigali, Terenozek and others. The 8 deposits in Mangistau area are captured by flooding processes. There is a danger of pollution of water area by oil products. In the Central Kazakhstan deterioration of an ecological condition is connected with field development. Here is located the largest coal-field, which is called the Karaganda coal basin. Development and operation of a deposit throughout several decades have led to degradation of an environment of region. Antropogenic forms of a relief are formed and such processes as salinization, waterlogging, impoundment have been strongly developed. The natural processes are activated. Small particles of rock drifted by wind on huge distances and pollute atmosphere and a soil-vegetative cover. Superficial and underground waters are polluted. In deposits of iron-manganous ore of Zhezkazgan region, sources of pollution are become open-cast mines, dumps of the wasted rocks, stores of manganaous and iron ores, coal and ashes dumps. In underground waters of a deposit from elements of 1 class of danger the increased content of beryl and phosphorus are marked; 2 classes - barium, arsenic, lithium and strontium; 3 classes - manganese and the titan. The

Balkhash mining industrial complex is the basic enterprise having negative influence on an ecological condition of lake Balkhash. Toxic substances such as copper, zinc, lead, cadmium, arsenic and antimony are got in lake with firm emissions [1].

Ecological and geographical researches of the small rivers of river basin Nura show, that the rivers are in a condition of degradation and full disappearance. The river Nura has about 20 considerable inflows of first order. The rivers Akbastau, Bajgozha, Kokpekty, Tuzdy, Shiderty, Ulken-Kunduzdy attribute to constant rivers. The small rivers become polluted by utility and industrial waters containing dissolved organic and mineral substances. The poisonous substances arriving in water reservoirs, change physical and chemical properties of water, a soil etc. Level of pollution of rivers depends on peculiarity of applied technological processes. At the expense of constantly arriving mine waters, the mineralization of the rivers Big and Small Bukpa increases to 1,4 g/l in the spring, and to 2,35 g/l in the autumn. These waters have polluting influence on alluvial-prolluvial horizon of underground waters. In annual balance of water feeding (feed) of the small rivers, underground waters compose in average 30 %. These waters also arrive in the small rivers. As a result against various degree of a mineralization (from 0,4 to 13,4 %) pollution of underground waters by nitrates (to 8 maximum permissible concentration), and their increased oxidation is marked. High deposition of underground waters level in a combination with their chemical compound and the increased content of pollutants represent danger to aluminum and lead covers of a cable, and also for some marks of cement and concrete. The organic substances containing in samples of water, exceed maximum permissible concentration in 16,5 times. Besides, individual excess of maximum permissible concentration is increased in 10-15 times, arriving in waters from the diesel stations submitting water for an irrigation. Cosmodrome "Baikonur" also have a bad influence on environment. Rocket fuel - geptil – relates to toxic connections of 1 class of hygienic danger, geptil is stable in soil and strongly sorbs and agglomerates in objects of environment, representing potential threat for health of the population of region. The mineral deposits and water resources of underground waters are located directly in areas of falling of separating parts of carrier rocket and in zones of their influence. When making ecologic and geomorphologic mapping, first of all it is necessary to pay attention to microform of relief. In territory of research, distribution and accumulation of rocket fuel will be in direct dependence on degree of a dividing of a relief. Concentrations of geptil are concentrated in places of gutter of thawed, soil and underground waters, in deepening of relief. The high content of geptil in plants that is connected with good solubility in water and comprehensibility of plants is noticed. Stability of geptil

depends on type and structure of soil. If the sandy soil sorbs to 40 % of geptil, the clay soil is capable sorb to 90 % of geptil. The 40 % of geptil, depending on type of soils, can remain in soils till 1 year and more. The modern antropogenic changes on arid geosystems of the Central Kazakhstan create an intense ecological situation in region, where the critical conditions of landscapes, leading to infringement of their stability and structure.

The extensive spaces stretching to the north from Kopet-Dag, Altai and Tan-Shan, having a complex and various relief, represent Southern Kazakhstan. Prevalence of sandy-argillaceous breeds on surfaces, high temperatures of soil, reducing of vegetative cover are created conditions for development of atmogenic processes. Low mountain ridges press in limits of a low strip, dividing it on the isolated sandy sites. The strip of deserts is formed by sandy massifs (mountain ranges) of East Priaralja, Kyzylkum, Mojynkum and sands of Southern Pribalhashja. From modern processes which influence relief formation, deflation and antropogenic processes are widespread. The basic ecological problem not only of Southern Kazakhstan, but a whole republic, is connected with the greatest catastrophe of 20 centuries - drying of Aral sea. This problem concerns to the category of global environmental problems. Now the dried up bottom of Aral sea represents lifeless sandy desert, with the area more than 27 thousand км². Annually, 75 million tons of sand and a dust from a surface of this desert rise in atmosphere of the earth. Besides, fine dust and salt from a surface of saline soils (solonchaks) are taken out in atmosphere, which are not besieged mechanically and are not registered by usual devices. The quantity of such poisonous salt can reach about 65 million ton in year. They are raised by wind on height of several kilometers, forming sole-dust clouds, and are transferred on enormous distances [3]. Process of drying of Aral sea has affected all natural components of region.



Fig. 1 Aral today [4].

Ecological problems of Ilie-Balkhash region are connected with processes of salinization, waterlogging, impoundment. Activization of the given processes is caused by antropogenic activity. There are irrigated massifs and pastures. Waterlogging processes in a valley of the river Ilie became more active as a result of building of the Kapchagaj water basin and a water utilization for irrigation. Large sites of waterlogging located on costal strip of lake Balkhash. There are characteristic natural-territorial complexes of landscapes in Akdalinsky and Karatalsky irrigated sites: filtrational lakes are formed in deepening of relief, on reserves of irrigation canals and channels of the old rivers, owing to flood of waste waters from irrigated fields, saline soils (solonchaks) were formed.

Thus, ecological problems of arid zones of Kazakhstan have not only republican, but also the international level. It is necessary to solve problem by joint efforts of the countries of PriCaspian and Priaralsky regions.

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