

Vladimir POPOVICHEV, Oleg EREMIN, Natalya RODIONOVA, Tatyana TSARINA and Nikolai BOBKOV, 2014. Primary Production and the Hydrochemical Parameters of the Salt Lakes in the North-Western Part of the Crimea (Russia). *Acta Geologica Sinica* (English Edition), 88(supp. 1): 96-97.

Primary Production and the Hydrochemical Parameters of the Salt Lakes in the North-Western Part of the Crimea (Russia)

Vladimir POPOVICHEV, Oleg EREMIN, Natalya RODIONOVA, Tatyana TSARINA and Nikolai BOBKOV

Institute of Biology of the Southern Seas, Sevastopol, the Crimea, 299011, Russia

1 Introduction

It is known that more than 300 lakes and lagoons are present in the Crimean Peninsula, which are divided depending on position to 7 groups: Perekop, Tarkhankut, Evpatoriyskaya, Khersonesskaya, lake on the mountain-pastures, Kerch and Genicheskaya. Almost the all lakes, with the exception of the small freshwater lakes, which situated on mountain pastures of the Main ridge of Crimean mountains, are salt and located along the coast in the low-lying steppe zone (Sustainable the Crimea, 2003).

The data of Kiyatskoe and Kirlutskoe lakes, which are related to Perekopskaya group salt lakes, as well as of Bakalskoe and Donuzlav lakes, which are related to Tarkhankut group, are presented in this abstract. Donuzlav Lake is the longest (30 km) and deepest (27 m) lake of Crimea, and the width of the lake near the sea is 9 km (Sustainable the Crimea, 2003).

The levels of all Perekopskaya group salt lakes are below, than the level of the Black Sea, and the basic filling of lakes by water occurs through the groundwater. The concentration of salts in the water higher, than in the ocean is caused by the isolation of these lakes from the sea. The natural salt setting occurs in the most of these lakes, which are lake-salt (Sustainable the Crimea, 2003).

Tarkhankut group of the salt lakes were formed as a result of the flooding by the Black Sea water of the wellhead parts of beams and them clipping from the sea by the sandy-gravelly spit, so the chemical composition of the water is not very different from the Black Sea (Sustainable the Crimea, 2003).

Salt lakes of the Crimea are the unique ecosystems with specific hydrochemical regime and structure of communities of living organisms. The change of the water

salinity due to weather and climatic fluctuations in different years is an important factor in changing the hydrochemical and hydrobiological regimes of these water ecosystems, which determine the change in biotic interactions between the organisms of the adjacent trophic levels (Balushkina et al., 2005).

It is established that in the hypersalty lakes, which are not freezing due to the high salinity of the water, and in the winter time the phytoplankton primary production more creates, than decomposes. In the winter period the value of destruction of the organic matter decreases, in comparison with the summer time, therefore in a winter time the organic matter more creates than degrades. This additional organic matter partly deposited in the bottom sediments, and partly is used by the biota during of the next summer season (Boulion, Golubkov, 2005; Primary production, 2006).

2 Results and Discussion

The aim of the conducted monitoring is to assess seasonal variations of the production and hydrochemical parameters, reflecting the ecological condition of the salt lakes in the North-Western part of the Crimea. The values of the primary production in the surface water of these lakes was determined by radiocarbon method with using ^{14}C .

The numerals of stations of the surface water sampling in the salt lakes in the North-Western part of the Crimean Peninsula are shown in Fig. 1 and Table 1. In Table 1 shows the coordinates of these stations.

The data which are presented in the Table 2 testify about the relatively low speed production process of the biotic component of suspended matter (fraction > 0.3 mkm) in the surface water of hypersalinity Kirlutskoe lake in the summer season, comparison with Kiyatskoe

* Corresponding author. E-mail: popovichev@ukr.net

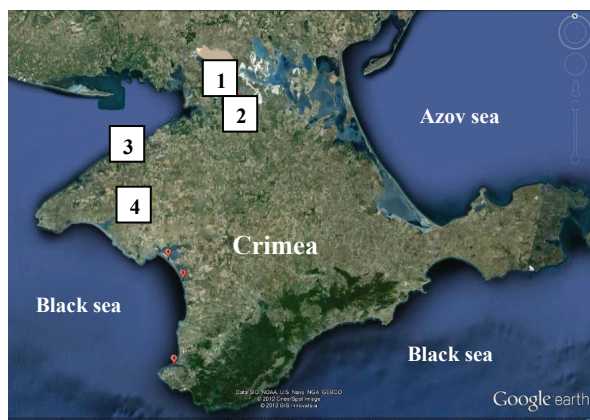


Fig. 1. Photo-scheme of the sampling station (numbers) in the salt lakes of the Crimea region.

Table 1 The name of the salt lakes with numbers and coordinates of the sampling stations

Station	Name of the lake	Latitude, N	Longitude, E
1	Kiyatskoe	46° 0.084'	33° 56.707'
2	Kirleutskoe	45° 57.550'	34° 1.321'
3	Bakalskoe	45° 44.004'	33° 10.246'
4	Donuzlav	45° 26.296'	33° 11.773'

lake. However, in the winter, in Kirleutskoe lake the NPP increase was marked in 4 times, and in Kiyatskoe lake – decreased in 1.6 times. It was conditioned by corresponding change of concentrations of the phosphate and nitrogen-containing salts. In general, production and hydrochemical characteristics of the water samples from the presented

water ecosystems testify about the eutrophic status of Kiyatskoe and Donuzlav lakes.

3 Resume

A wide range of the obtained results of the hydrobiological parameters (NPP, C_{sed} (dw)) is caused by a compound complex of the seasonal, climatic, geographical, hydrological and hydrochemical conditions, creating for the biota of salt lakes hydrobiological local specifics.

Key words: the Black Sea, the Crimea, salt lakes, hydrochemical parameters of salt water, primary production

References

- Balushkina E.V., Golubkov S.M., Golubkov M.S., Litvinchuk L.F., Shadrin N.V., 2005. Characteristic features of ecosystems of hyperhaline lakes of the Crimea // Proceeding of the Zoological Institute (Proc. Zool. Inst. Russ. Acad. Sci.). – Vol. 308: 5–13 (in Russian).
- Boulion V.V., Golubkov M.S., 2005. Biological productivity of the saline lakes of Crimea // Proceeding of the Zoological Institute (Proc. Zool. Inst. Russ. Acad. Sci.). – Vol. 308: 13–21 (in Russian).
- Primary production and composition of phytoplankton assemblages in hypersaline lakes of the Crimea. 2006 // Proceeding of the Zoological Institute (Proc. Zool. Inst. Russ. Acad. Sci.). – Vol. 310: 59–66 (in Russian).
- Sustainable the Crimea. Water resources. – Simferopol: Taurida, 2003. – 413 p. (in Russian).

Table 2 The name of the salt lakes with biotic and abiotic characteristics of surface water for summer and winter seasons

Name of the lake	Season	Salinity	NPP	C _{sed} (dw)	NO ₂	NO ₃	NH ₄	PO ₄	pH
		‰	mg C·m ⁻³ ·day ⁻¹	mg·L ⁻¹	mkg·L ⁻¹				
Kiyatskoe	Summer	78.1	383.0	28.0	5.0	24.4	181.8	18.2	7.90
	Winter	82.6	236.5	45.0	3.4	11.8	0.0	1.8	8.09
Kirleutskoe	Summer	242.8	21.9	152.0	8.7	27.3	88.4	14.7	7.58
	Winter	190.4	85.8	292.0	11.5	244.0	0.0	0.0	8.16
Bakalskoe	Winter	17.9	38.4	6.5	3.4	518.9	62.1	9.5	8.61
Donuzlav	Winter	16.2	188.5	3.7	8.6	201.8	13.6	14.0	8.63

Note: Sampling dated 10th of August 2012 (summer) and 19th of February 2013 (winter).
NPP – Net Primary Production, C_{sed} (dw) – sediment concentrations (dry weight)