



Research Journal of Pharmaceutical, Biological and Chemical Sciences

Current Environment State of Coastal Marine Water of Dagestan.

S. A. Guseinova*.

C and. Sc. {Biology}, Head of Basics of safety measures in life Department, professor, Honored Worker of Higher Education of the Republic of Dagestan, Dagestan State University 367025, Republic Dagestan, Makhachkala, M. Gadzhieva street, 43a.

ABSTRACT

We have analyzed current environmental state of the Dagestan coast of the Caspian Sea. Data on the spatial variability of contaminant concentration in the coastal areas of the Dagestan segment of the Caspian Sea from the northern districts (Lopatin) to the central (Sulak coastal land) and, further, to the southern district, coastal land of the river Samur (within Russian subsoil management sector) confirm that now it is caused by irregular contamination of the sea by above-ground sources. Dagestan coastal area of the Caspian Sea. Concentration analysis of background contamination of chemical agents in the Dagestan coastal water from northern districts (Lopatin) to southern (Sulak coastal land) during the period between 2004 and 2007. Data on the spatial variability of contaminants in the coastal areas of the Dagestan segment of the Caspian Sea from the northern districts (Lopatin) to the central (Sulak coastal land) and, further, to the southern district (within Russian subsoil management) confirm that it is caused by irregular contamination of the sea by above-ground sources. The envisaged large-scale hydrocarbon resource development requires regular monitoring of sea currents on Makhachkala, Izberbash and Derbent roads.

Keywords: background contamination, petroleum hydrocarbons, environmental monitoring, sea currents

**Corresponding author*

INTRODUCTION

The Dagestan coast of Caspian sea is a special area as waters of the Middle Caspian sea are mixed there with Volga metamorphosed waters under complementary effect of river flows of Dagestan. Due to such particular forming water in coastal areas has self-cleaning ability and differs by special biological efficiency [1]. The Volga plume extends across the entire Dagestan coast and supplies biogenic elements in waters of the Dagestan shelf providing biological efficiency with this. At the same time together with bioresources the Volga plume supplies into shelf waters harmful matters in a considerable amount that contaminates coastal waters. [2].

OBJECTIVE AND METHODS OF RESEARCH

The analysis of concentration of chemicals in the Dagestan coast water has been carried out starting from northern regions (Lopatin) and up to the southern regions (coastal land of the river Samur) since 2004 till 2007. The results are shown in Table 1.

Lopatin.

The concentration of petroleum hydrocarbons varied from zero to 0.16 mg/l (3 maximum concentration limits). In 2007 it has made on the average 0.04 mg/l (0.8 maximum concentration limits) at a maximum 0.06 mg/l (1.2 maximum concentration limits). In comparison with previous years decrease in not only average, but also the maximum concentration of petroleum hydrocarbons in water was observed (tab. 1). Thus, the minimum concentration of phenols in water has made 0.001 mg/l (1 maximum concentration limit), and the maximum 0.004 mg/l (4 maximum concentration limits); whereas the average concentration of phenols in water has made 0.003 mg/l (3 maximum concentration limits). So, in comparison with 2005 the average concentration has not changed, and the maximum one has a little increased.

Ammoniacal load in all samples was significantly lower than the maximum concentration limit. It ranged from 43 to 119 mg/l having averaged to 82 mg/l. Compared with 2005 the Compared in water has increased (the maximum value was virtually unchanged), and in comparison with 2004 it has decreased. In 2007 in comparison with 2005 total nitrogen and phosphorus concentrations lowering was noted. Values for these biogenes in water in 2007 are close to those registered in 2004. Against decrease in trophicity of water, increase in oxygen content in water was observed that varied over the range of 8.0-15.0 mg/l having averaged 11.5 mg/l. Value of pollution source index has made 1.13. As well as in 2005, water is characterized as "moderately contaminated" (III grade), quality of waters has not changed as a whole (tab. 2). [3].

River Terek coastal area.

In 2007 the content of petroleum hydrocarbons in water was changed to 0.09 milligram/liter, upon that, the admissible norm is up to 1.8 milligram/liter. On the average, concentration of petroleum hydrocarbons makes 0.06 milligram/liter. In Table 1 we can see a trend of decreasing in of petroleum hydrocarbons concentration in comparison with the past years.

The strongest concentration of phenols in water up to 0.006 milligram/liter, the least concentration was 0.001 milligram/liter. The average index of concentration of phenols in water was 0.004 milligram/liter. As to ammonium nitrogen, all samples of the Caspian water have demonstrated concentration that was much less than maximum permissible limit. Average indications on ammonium nitrogen make 89 mg/l though they can vary within the range from 36 to 133 milligram/liter. If to compare ammoniacal load in sea water to indexes of 2005 it is possible to notice a trend to growth, and in comparison with 2004 the indexes remain practically equal. In total, average concentration of total nitrogen is step-by-step decreased. Positive aeration of waters, in particular, in a benthic zone was observed on the coast without dependence from a season. Indexes under the oxygen content in sea water also varied within the limits from 8.4 to 14.6 milligram/liter, average concentration of oxygen was equal to 11.1 milligram/liter that exceeds indexes for 2004 and 2005. It is evident from table 2 that quality of water in comparison with past years has a little improved, the water pollution index makes 1.49 that allows water to characterize as contaminated instead of dirty as it was earlier.

River Sulak coastal area.

In this region the content of petroleum hydrocarbons varied from 0 to 0.08 milligram at limiting concentration of 1.6 mg/l. Average concentration is equal to 0.04 milligram/liter. In table 1 decrease of the maximum and average concentrations of petroleum hydrocarbons in comparison with 2005 is demonstrated. The greatest concentration of phenols has reached a point of 0.006 milligram/liter, and the least was 0.001 milligram/liter, on the average concentration of phenols has reached 0.004 mg/l. If to compare the average concentration of phenols in comparison with 2005 we can say that it remained invariable, however the maximum concentration was decreased. It has not been revealed any violations in samples of ammonium nitrogen, its concentration was below the marginal coefficient. On the average, indexes on the ammonium nitrogen content were equal to 83 microgram/liter, but they can vary from 30 to 163 mg/l.

In comparison with 2005 increase in average ammoniacal load and decrease in its maximum values in water are noted. The maximum ammoniacal load in comparison with 2004 (tab. 1 [3]) has specially decreased. Average concentration of total nitrogen and total phosphorus remained practically invariable.

During all seasons of year good aeration of waters, including in a bottom layer was noted on the estuarine coastal area of the river Sulak. The dissolved oxygen level in sea waters has varied over the range of 8.8-15.8 mg/l having averaged to 10.7 mg/l. Value of pollution source index has made 1.39. As well as in 2004-2005, water was characterized as "contaminated" (IV grade), quality of waters as a whole was not changed (tab. 2).

Makhachkala.

In Makhachkala region the content of petroleum hydrocarbons varied within the limits from 0.01 to 0.12 milligram/liter. Average concentration of petroleum hydrocarbons was equal to 0.06 mg/l at maximum admissible concentration equal to 1.2. Table 1 demonstrates decreasing in both average, and maximum concentration of petroleum hydrocarbons for 2004. The maximum concentration of phenols in waters of the region makes 0.006 milligram/liter, and the least was 0.001 milligram/liter. Concentration of phenols was equal to 0.004 mg/l on the average. If to compare to past years [4] average concentration has remained invariable, and the maximum concentration was decreased to a level of indexes of 2004. Ammoniacal load was below maximum permissible concentration (from 29 to 134 microgram/liter) as well as the previous regions, and on the average it makes 65 milligram/liter.

In comparison with 2005 weak increase of average ammoniacal load in water was noted. For the entire period of study maximum concentration limit excess on ammonium nitrogen has been noted only in 2004. Average concentration of total nitrogen and total phosphorus remained practically invariable.

During all seasons of year good aeration of waters, including in a bottom layer was noted in the region. The dissolved oxygen level in sea waters varied over the range of 7.6-14.3 mg/l, having averaged to 11.3 mg/l that is higher than in previous years.

Value of pollution source index has made 1.47. As well as in 2004-2005 waters are characterized as "contaminated" (IV grade), quality of waters was not changed as a whole (tab. 2). [3].

Kaspiysk.

Concentration of petroleum hydrocarbons varies from 0.01 to 0.05 milligram/liter. Average concentration was 0.03 milligram/liter. For today, the average and maximum content of hydrocarbons is lower than past years that is evident from table 1. The maximum concentration of phenols in the Caspian region is equal to 0.006 milligram/liter, the least is 0.001 mg/l, and the average value is 0.004 milligram/liter. Thus, average concentration has remained invariable, and variations concern only the maximum indexes.

Water sample for revealing ammonium nitrogen has demonstrated the value much lower to permissible concentration. Average concentration is equal to 56 microgram/liter, upon that, it can vary from

19 to 111 milligram/liter. Lowering of average ammoniacal load was noted, that it is especially apparent with indexes for 2004 and 2005.

Besides, concentration of total phosphorus and total nitrogen has decreased. The region differs by good aeration of waters, including in a benthic zone. Also oxygen variation has been noted upon sea water study in the region. On the average, concentration of dissolved oxygen makes 10.4 milligram/liter, and it is much higher than in previous years. The oxygen content in sea water has changed from 7.6 to 12.5 milligram/liter. Water in the Caspian region by contamination index falls into IV grade and it is considered contaminated. Apparently from table 2, quality of water under the main characteristics remains invariable. [5].

Izberbash.

Content of petroleum hydrocarbons in waters of region Izberbash varied from 0.01 to 0.06 milligram/liter. Average concentration was 0.04 milligram/liter. Average concentration of petroleum hydrocarbons has decreased approximately twice if to compare to previous years [6], and indexes of the maximum concentration have decreased in 6 times that is apparent from table 1. Maximum content of phenols is 0.004 milligram/liter, the least one is 0.001 milligram/liter. Average concentration makes 0.003 milligram which one does not vary last years.

The ammonium nitrogen content remains much lower than maximum permissible concentration. Concentration varied within 22-112 micrograms per liter, average concentration makes 65 micrograms. Now the maximum value of ammonium nitrogen is much lower than it was possible to observe past years. Average concentration was a little increased if to compare it to indexes of 2005, and indexes of total nitrogen concentration for 2004 remained practically invariable. The content of total phosphorus in the region has approximately twice decreased. Aeration of waters has positive behavior. Concentration of dissolved oxygen varies from 9.0 to 12.3 milligram/liter, and 10.8 milligram on the average. A water pollution index is 1.13. In 2006 water in the region was characterized as moderately contaminated. It is apparent from table 2 that quality of water has a little improved in comparison with 2004 and 2005 when water was characterized as contaminated.

Derbent.

The content of petroleum hydrocarbons varied from 0.01-0.10 milligram/liter, average concentration was 0.06 milligram. In table 1 decrease of the maximum and average concentrations of petroleum hydrocarbons in waters of the region is demonstrated. Maximum content of phenols has approached a level of 0.004 milligram/liter, the least is 0.001 mg/l. The content of phenols is equal to 0.003 milligram/liter on the average that remains invariable during 2004-2005.

Ammoniacal load in all samples was essentially lower than the maximum concentration limit. Average concentration of total nitrogen and total phosphorus has remained practically invariable. While in 2007 events of substantial growth of total phosphorus concentration to 49.0 mg/l have been noted.

As in other investigated regions, the good oxygen regimen was noted in the region. Value of pollution source index has made 1.23. In 2007 water of region were characterized as "moderately contaminated" (III grade). Quality of waters has improved (tab. 2) in comparison with 2005 when waters were evaluated as "contaminated" (IV grade).

Coastal area of the river Samur

Concentration of petroleum hydrocarbons varied within the limits from null up to 0.10 mg/l (2.0 maximum concentration limits). On the average it has made 0.04 mg/l (0.8 maximum concentration limits). In comparison with previous years essential decrease of average and maximum concentration of petroleum hydrocarbons in sea water (tab. 1) was noted.

The maximum concentration of phenols in water has made 0.004 mg/l (4 maximum concentration limits), minimum was 0.001 mg/l (1 maximum concentration limit). Average concentration of phenols in water was equal to 0.003 mg/l (3 maximum concentration limits). In comparison with the previous year the level of contamination of sea waters by phenols was not changed in the region.

Ammoniacal load in all samples was essentially lower than the maximum concentration limit. It has varied within the limits from 13 to 121 mg/l having averaged to 64 mg/l. In comparison with the previous year increase in average ammoniacal load in water was noted. Average concentration of total nitrogen has decreased, and total phosphorus concentration has raised.

During all seasons of year good aeration of waters including in a bottom layer was noted in the region. The dissolved oxygen level in sea waters varied over the range of 8.7-12.1 mg/l having averaged to 10.4 mg/l. It was higher than in past year. Value of pollution source index has made 1.13. In 2006, waters of region were characterized as "moderately contaminated" (III grade). In comparison with the previous year when waters were evaluated as "contaminated" (IV grade), quality of waters has improved.

GAINED RESULTS AND THEIR DISCUSSION

Thus, in 2007 the state of sea waters dirtiness in the regions where monitoring was carried out may be characterized as representative. In an open part of the sea, in northern (Lopatin) and southern (Izberbash, Derbent, Samur) regions of the Dagestan coastal area it is possible to evaluate sea waters as "moderately contaminated". In the regions exposed to river flows (the river Terek and the river Sulak coastal areas) and discharges of urban waste water (Makhachkala and Kaspiysk), sea waters are evaluated as "contaminated". In comparison with previous years improvement of waters quality in a coastal area of the river Terek and in a southern part of the Dagestan coastal area is noted. It can be assumed that the first is caused by decrease of input of contaminants with a Terek river flow, and the second is caused by water exchange improvement between an open part of the sea and a offshore strip.

Table 1. Average annual and maximum chemical contaminant concentration in Dagestan coastal land in 2004 – 2007

Region	Ingredients	2004		2005		2007	
		C*	Maximum concentration limit	C*	Maximum concentration limit	C*	Maximum concentration limit
Lopatin	Petroleum hydrocarbons	0.07	1.4	0.06	1.2	0.04	0.8
		0.26	5	0.16	3	0.06	1.2
	Phenols	0.004	4	0.003	3	0.003	3
		0.007	7	0.006	6	0.004	4
	Nitrogen	100.8	<0.5	58.9	<0.5	81.8	<0.5
	Ammonium nitrogen	164.8	<0.5	126.1	<0.5	119.0	<0.5
	Total nitrogen	124		739.3		541	
		896		2243.0		777	
	Phosphorus	22.4		33.3		29.1	
	Total phosphorus	63.2		269.2		51.0	
Oxygen	9.27		9.63		11.51		
	7.63		4.57	<1.0	7.97		
Coastal area	Petroleum hydrocarbons	0.07	1.4	0.08	1.6	0.06	1.2
River Terek		0.24	5	0.17	3	0.09	1.8
	Phenols	0.004	4	0.005	5	0.004	4
		0.007	7	0.007	7	0.006	6
	Nitrogen	84.5	<0.5	56.4	<0.5	89.3	<0.5
	Ammonium nitrogen	257	0.6	116.1	<0.5	132.5	<0.5
	Total nitrogen	580		559		510	
		1320		1128		631	
	Phosphorus	22.6		32.8		29.7	
	Total phosphorus	81.2		70.3		65.7	
Oxygen	8.82		9.63		11.10		
	1.22	<1.0	5.34	<1.0	8.43		
Coastal area	Petroleum hydrocarbons	0.03	0.6	0.05	1.0	0.04	0.8
River Sulak		0.06	1.2	0.25	5	0.08	1.6
	Phenols	0.003	3	0.004	4	0.004	4
		0.005	5	0.008	8	0.006	6



	Nitrogen	79.2	<0.5	59.1	<0.5	83.0	<0.5
	Ammonium nitrogen	329.6	0.8	210.0	0.5	162.5	<0.5
	Total nitrogen	573		506		511	
		1012		821		682	
	Phosphorus	30.5		30.8		27.3	
	Total phosphorus	92.8		257.3		86.4	
	Oxygen	9.23		10.34		10.71	
		7.50		5.58	<1.0	8.80	
Makhachkala	Petroleum hydrocarbons	0.03	0.6	0.08	1.6	0.06	1.2
		0.11	2.2	0.17	3	0.12	2.4
	Phenols	0.003	3	0.004	4	0.004	4
		0.007	7	0.009	9	0.006	6
	Nitrogen	141.5	<0.5	58.6	<0.5	65.3	<0.5
	Ammonium nitrogen	221.0	0.6	78.8	<0.5	134.2	<0.5
	Total nitrogen	577		576		617	
		1036		921		891	
	Phosphorus	27.1		24.0		22.7	
	Total phosphorus	60.9		59.1		54.2	
	Oxygen	9.13		11.05		11.31	
		6.11		6.23		7.55	
Kaspiysk	Petroleum hydrocarbons	0.06	1.2	0.12	2.4	0.03	0.6
		0.13	2.6	0.31	6	0.05	1.0
	Phenols	0.004	4	0.003	3	0.004	4
		0.007	7	0.007	7	0.006	6
	Nitrogen	90.3	<0.5	68.9	<0.5	55.7	<0.5
	Ammonium nitrogen	288.0	0.7	220.0	0.6	111.0	<0.5
	Total nitrogen	567		533		507	
		1112		904		930	
	Phosphorus	26.0		20.6		19.7	
	Total phosphorus	171.2		50.9		48.0	
	Oxygen	8.87		9.89		10.37	
		6.19		8.00		7.57	
Izberbash	Petroleum hydrocarbons	0.09	1.8	0.08	1.6	0.04	0.8
		0.41	8	0.18	4	0.06	1.2
	Phenols	0.003	3	0.003	3	0.003	3
		0.005	5	0.007	7	0.004	4
	Nitrogen	85.5	<0.5	54.9	<0.5	64.6	<0.5
	Ammonium nitrogen	170.7	<0.5	169.1	<0.5	112.1	<0.5
	Total nitrogen	535.3		398		480	
		1256		526		731	
	Phosphorus	22.2		24.3		20.5	
	Total phosphorus	100.9		48.7		49.0	
	Oxygen	10.29		9.85		10.75	
		5.20	<1.0	5.83	<1.0	8.99	
Derbent	Petroleum hydrocarbons	0.13	2.6	0.08	1.6	0.06	1.2
		0.41	8	0.16	4	0.10	2.0
	Phenols	0.004	4	0.003	3	0.003	3
		0.007	7	0.004	4	0.004	4
	Nitrogen	80.4	<0.5	47.2	<0.5	80.4	<0.5
	Ammonium nitrogen	153.0	<0.5	150.2	<0.5	113.6	<0.5
	Total nitrogen	494		442		435	
		964		680		690	
	Phosphorus	13.4		22.6		24.0	
	Total phosphorus	47.2		46.2		60.8	
	Oxygen	8.88		8.99		11.33	
		5.39	<1.0	6.23		8.83	
Coastal area	Petroleum hydrocarbons	0.06	1.2	0.07	1.4	0.04	0.8
River Samur		0.19	4	0.19	4	0.10	2.0

	Phenols	0.002	2	0.003	3	0.003	3
		0.004	4	0.004	4	0.004	4
	Nitrogen	77	<0.5	45.4	<0.5	64.3	<0.5
	Ammonium nitrogen	126.2	<0.5	96.1	<0.5	121.1	<0.5
	Nitrogen	565		547		425	
	Total nitrogen	610		961		610	
	Phosphorus	15.9		16.5		20.6	
	Total phosphorus	25.6		22.5		49.0	
	Oxygen	9.51		9.47		10.44	
		7.76		7.12		8.73	

Notes:

1. Concentration C* of petroleum hydrocarbons, phenols, and oxygen dissolved in water is shown in mg/l; ammonium nitrogen, total nitrogen, and total phosphorus in mg/l.
2. In the upper line the average value for the year, and in the bottom line the maximum (minimum for oxygen) value are specified for each ingredient.
3. Values of maximum concentration limit from 0.5 to 3.0 are specified with the decimal fractions; and values higher than 3.0 are rounded off to integers.

Table 2. Quality control of marine water of Dagestan coastal land according to water pollution index in 2002 – 2007

Region	2004		2005		2006		2007		Average pollution content (in terms of maximum concentration limit)
	Water pollution index	Grade							
Lopatin	1.58	IV	1.24	III	1.13	III	1.22	III	Phenols – 3 Petroleum hydrocarbons - 1.0
River Terek coastal area	1.57	IV	1.84	V	1.49	IV	1.48	IV	Phenols – 4; Petroleum hydrocarbons – 1.2
River Sulak coastal area	1.11	III	1.43	IV	1.39	IV	1.17	III	Phenols – 4
Makhachkala	1.15	III	1.57	IV	1.47	IV	1.29	IV	Phenols – 4; Petroleum hydrocarbons – 1.2
Kaspiysk	1.53	IV	1.55	IV	1.33	IV	1.26	IV	Phenols – 4
Izberbash	1.40	IV	1.34	IV	1.13	III	1.26	IV	Phenols – 3
Derbent	1.87	V	1.35	IV	1.23	III	1.56	IV	Phenols – 3; Petroleum hydrocarbons – 1.2
River Samur coastal area	1.01	III	1.29	IV	1.13	III	1.21	III	Phenols – 3

In 2007 observations for contamination of sea waters of the Dagestan coast in Middle Caspian sea within the frameworks of Global Observing System program were carried out in the same coastal areas of Dagestan (Lopatin, Makhachkala, Kaspiysk, Izberbash, Derbent, estuarine coastal areas of the river Terek, the river Sulak, and the river Samur).

In 2007 concentration of petroleum hydrocarbons in coastal waters of Dagestan varied within the limits from null to 0.08 mg/l (1.6 maximum concentration limits). The maximum value recorded in Makhachkala and Derbent regions and on a river Terek coastal area, apparently, is caused by uncontrolled waste disposal and increased contamination of river waters entering the sea. Average concentration of petroleum hydrocarbons in the water exceeding maximum concentration limit was recorded only in two regions: Makhachkala and Derbent (tab. 3). It also was lower than maximum concentration limit only in two regions: in coastal areas of the river Sulak and the river Samura in which basins there are no big human settlements and industrial factories. [3].

In 2007 concentration of phenols in coastal waters of Dagestan varied within the limits from null to 0.006 mg/l (6 maximum concentration limits). The maximum value recorded in the region Izberbash and in the river Terek coastal area, apparently, was caused by uncontrolled waste disposal and increased contamination of river waters entering the sea. The maximum average value 4 times exceeding maximum concentration limit was recorded in two regions: a coastal area of the river Terek and near Derbent (tab. 3).

Ammoniacal load in coastal waters of Dagestan did not exceed maximum concentration limit and varied within the limits from null to 190 mg/l. Ammoniacal load in coastal waters increased in a direction from south to north that indicates entering of biogenic elements to Middle Caspian sea with the North Caspian waters. The least average value of N-NH₄ concentration in water was observed in an open part of the sea.

Table 3. Average annual and maximum chemical contaminant concentration in coastal lands of the Middle Caspian Sea in 2007

Sea region	Petroleum hydrocarbons, mg/l		Phenols, mg/l		N-NH ₄ , mg/l	
	Average	Maximum	Average	Maximum	Average	Maximum
Lopatin	0.05	0.07	0.003	0.004	116	190
River Terek coastal area	0.05	0.08	0.004	0.006	122	185
River Sulak coastal area	0.04	0.06	0.003	0.005	103	177
Makhachkala	0.06	0.08	0.003	0.005	117	151
Kaspiysk	0.05	0.06	0.003	0.004	102	139
Izberbash	0.05	0.06	0.003	0.006	85	121
Derbent	0.06	0.08	0.004	0.005	94	121
River Samur coastal area	0.04	0.05	0.003	0.003	102	125

Waters of the majority of regions in Middle Caspian Sea where in 2007 observations for contamination of sea waters were carried out, should be categorized as "contaminated" by their hydrochemical indexes (Water pollution index) (tab. 4). Only in those regions where contamination from above-ground sources for a variety of causes was rather low (Lopatin, a coastal area of river Sulak and Samur, and also in an open part of a sea) waters were evaluated as "moderately contaminated". In comparison with the previous year quality of waters in a river Sulak coastal area has improved, and on the contrary, quality of waters in the region Izberbash was degraded [3].

Table 4. Average annual and maximum petroleum hydrocarbons concentration in Dagestan coastal land of the Middle Caspian Sea in 1978 – 2007

Regions	January		March		May		July		September		October		Year	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Initial data arrays														
Lopatin - Northern zone	0.08	0.65	0.08	0.84	0.07	0.54	0.05	0.61	0.09	1.34	0.10	3.02	0.08	3.02
Terek - Northern zone	0.08	0.62	0.08	0.65	0.08	0.79	0.07	0.84	0.08	0.53	0.07	0.46	0.08	0.84
Sulak - Northern zone	0.07	0.70	0.06	0.57	0.06	0.36	0.06	0.80	0.07	0.62	0.07	0.91	0.07	0.91
Makhachkala - Central zone	0.07	1.14	0.06	1.40	0.07	0.69	0.09	1.00	0.06	0.56	0.05	1.06	0.07	1.40
Kaspiysk - Central zone	0.06	1.06	0.05	1.06	0.07	0.32	0.06	0.43	0.07	0.43	0.07	0.62	0.06	1.06
Izberbash - Central zone	0.08	0.75	0.12	1.81	0.09	0.45	0.06	0.39	0.10	1.41	0.06	0.41	0.08	1.81

Derbent - Southern zone	0.05	0.56	0.08	1.63	0.08	0.36	0.05	0.49	0.10	1.39	0.05	0.41	0.07	1.63
Samur - southern zone	0.05	0.23	0.07	0.33	0.06	0.22	0.05	0.60	0.06	0.34	0.03	0.23	0.05	0.60

INSIGHTS

Versatile nature both of contaminants, and using of coastal waters causes the important problem related to transfer of pollutants, that was especially relevant to the priority development of mineral resources of shelf. Earlier (60 and 70th years) Dagestan Center of hydrometeorology and monitoring of environment [3] carried out regular observations for sea currents on the sea roads of Makhachkala, Izberbash, and Derbent. So, the planned large-scale development of hydrocarbonaceous resources of Caspian sea presses for restoring these studies. [7].

CONCLUSION

Thus, analyzing the introduced data about the spatial variability of pollutants concentration in coastal areas of the Dagestan segment of Caspian sea: from Northern regions (Lopatin) to central (coastal area of the river Sulak and, further, to the southern district (within Russian subsoil management area), it should be pointed out that now it is caused by irregular contamination of the sea from above-ground sources.

REFERENCES

- [1] Abdurakhmanov G.M., Guseynova S.A. Ecological and zoogeographical evaluation of biodiversity of the Caspian Sea. The South of Russia: ecology and development. 2012. No. 1.-P. 10-28.
- [2] Estuarial part of Volga river: hydrological and morphological processes, contaminant mode and the impact of the Caspian Sea level fluctuation.//GEOS.-Moscow, 1998. - P.280.
- [3] Guseynova S.A. 2013. [The Caspian Sea environmental situation assessment and potential impact of oil-and-gas-field operation]. (Executive editor Zaicev V.F.)// Partnership for Scientific Publications, KMK. - Moscow-P. 53-55
- [4] Osmanov M.M., Aligadzhiev M.M. Coastal ecosystems' state under anthropogenic intervention.//Natural Science Progress.-2004. No. 11.-P. 44-45.
- [5] Guseynova S.A Toxic Ingredient Content in the Organs and Tissues of Hydrobionts in Central Caspian District.//The South of Russia: ecology and development. 2013. No. 4,-P. 158-166.
- [6] Butaev A.M., Gadzhiev A.Z. Current state and perspective trends of the Caspian ecosystem//Herald of Dagestan Research Center of the Russian Academy of Science. - 1999 No. 4. P.85-95.
- [7] Guseynova S.A., Abdurakhmanov G.M. Ecological evaluation of Dagestan shelf of the Caspian Sea contamination by petroleum hydrocarbons. Problems of Regional Ecology", - 2007. No. 6-P. 75-85.