Diesen Einfluss bedingt der Chemismus des Prozesses. Ein niedriger Verhältnis von Isobutan und Buten erhöht die Reaktionsgeschwindigkeit der Dealkylierung und Polymerisation.

Die Modellberechnungen haben gezeigt, dass die Erhöhung von Isobutan im Rohstoff auch die Oktanzahl erhöht (Abb. 2, 3). Der hohe Gehalt von Isobutan im Rohstoff inhibriert die Nebenreaktionen und bildet eine stabile schwefelhaltige Säureemulsion.

Die steigende Temperatur erhöht die Wahrscheinlichkeit der Nebenreaktionen und Bildung der Komponenten mit niedriger Oktanzahl (Abb. 4).
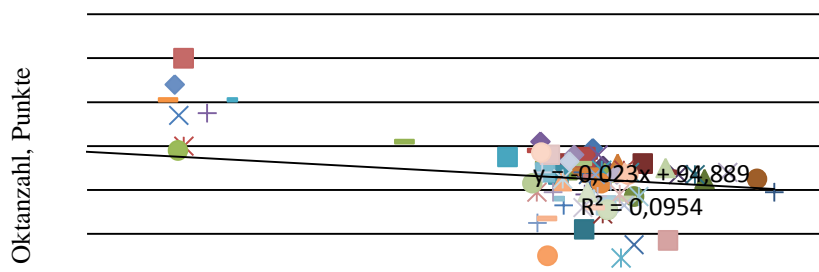
Emulsionstemperatur am Reaktorausgang, Celsiusgrad

Abb. 4. Wirkung der Temperatur auf die Alkylatoktanzahl

Die Modellberechnungen haben gezeigt, dass die Alkylate, die aus dem Rohstoff mit geringerem Massenanteil von Isobutan hergestellt sind, die niedrige Oktanzahl haben. Dabei wirken die Unterschiede in der Zusammensetzung der verarbeiteten Rohstoffe wesentlich auf die Treibstoffklopffestigkeit von 1,0 bis 2,0 Punkte. Es war auch festgestellt, dass die Oktanzahl von der Prozesstemperatur abhängig ist.

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THE GEOCHEMISTRY OF UNDERGROUND WATER OF EAST KAMCHATKA
A.S. Efstifeeva
Scientific advisors professor G.N. Kopylova, associate professor N.V. Guseva, associate professor I.A. Matveenko
National Research Tomsk Polytechnic University, Tomsk, Russia

Kamchatka peninsula is located in interaction area of Pacific oceanic and Okhotsk-sea continental plates. On Kamchatka's east coast there are up to 30 active volcanoes. These factors determine high seismic activity of this region. That is why the problem of researching features of hydrogeochemical composition of local waters is very pertinent.Observations for hydrogeochemical mode of groundwater in Petropavlovsk-Kamchatsky area are carried out by Kamchatka's branch of RAS Geophysics survey at 4 hydrogeological stations with frequency one time per 3 or 6 days.

Based on these data the earthquake prediction methods are developed [4]. However, question of genesis of such hydrogeochemical anomalies did researched in science literature not enough, therefore, further research is needed for proper planning of specialized observations in wells and watersource.

In this article the specificity of the chemical composition of underground water is considered in terms of their degree of saturation with aluminosilicate minerals.

Table shows that groundwater from water source is neutral based on hydrogen ion concentration and fresh based on mineralization. The chemical composition is chloride-hydrocarbonate and calcium-sodium.

Underground water from wells GK1 and G1 is slightly alkaline, salted in chemical composition is chloride calcium-sodium. Underground water from well M1 and boreholes from station Verhnyaya Paratunka is generally characterized by a high alkalinity and low salinity. In well M1 underground water is bicarbonate-sulphate calcium-sodium, chemical composition in wells GK5, GK15 and GK44 is chloride-sulfate sodium.

During investigation of underground water saturation of wells and sources to rock-forming minerals equations of water interaction with aluminosilicate, carbonate and sulfate minerals and their main thermodynamic parameters are used represented by reaction constant logarithm and quotent reaction equation [2]. The degree of water saturation in reference to secondary minerals has been measured with the use nonequillibrium index [3]. With the water saturation value A decreases and tends to zero. During oversaturation of waters values A become negative, A = 0 characterizes balance of equilibrium. The capacity of aqueous liquid to enter into chemical interaction is characterized by ion-activity. Activity coefficient is calculated using the Debye-Huckel formula for low-mineralized liquid [4].

For visualize the results of calculation was used diagrams stability fields of aluminosilicate and carbonate minerals (Fig.).

Table

Chemical and gas composition underground water

| Hydrogeological station. Well, watersource	Well depth, m	pH	T, °C	Water salinity, g/l	H₄SiO₄, mg/l	Analytical concentration, mg/l							Gas composition
						Ca^{2+}	Mg^{2+}	K^+	Na^+	HCO_3^-	SO_4^{2-}	Cl^-	
Station Pinachevo													
Well GK1	1261 m	7,5	16	9,8	87,6	856	-	89,6	2353,4	168,2	173,5	5413,6	**Methane**
Watersource P-I1	-	7,27	6,5	0,3	66,77	11,8	10,5	4,6	9,4	121,6	1,52	132,7	**Methane**
Watersource P-I2/1	-	7,74	10,3	0,9	74,4	23,7	24	11,7	248,6	274,7	1,47	363,2	**Methane**
Watersource P-I2/2	-	7,6	9,8	0,9	73,6	22	21,5	10,8	226,2	244,1	1,45	329,1	**Methane**
Watersource P-I3	-	7,4	5,5	0,1	61,9	6,9	5,8	2,3	21,9	63,28	4	28,2	**Nitrogen**
Moroznaya, well M1	600 m	8,86	16	0,2	24	24,6	-	0,4	22,1	29,02	100	2,42	**Nitrogen**
Hlebozavod, well G1	2542 m	8,18	16	10,2	3,9	188,6	-	-	3639,9	177,7	330	5873,6	**Methane**
Station Verhnyaya Paratunka													
Well GK5	900 m	8,26	75,5	0,8	92,3	44,6	-	6,81	219,5	49,2	395,2	114,9	**Nitrogen**
Well GK15	1208 m	8,7	20	0,7	31,9	-	-	1,7	153,4	29,7	406,6	70,5	**Nitrogen**
Well GK44	650 m	8,1	25,7	0,3	31,8	33,9	-	1,98	69,9	61,7	144,3	33,1	**Nitrogen**
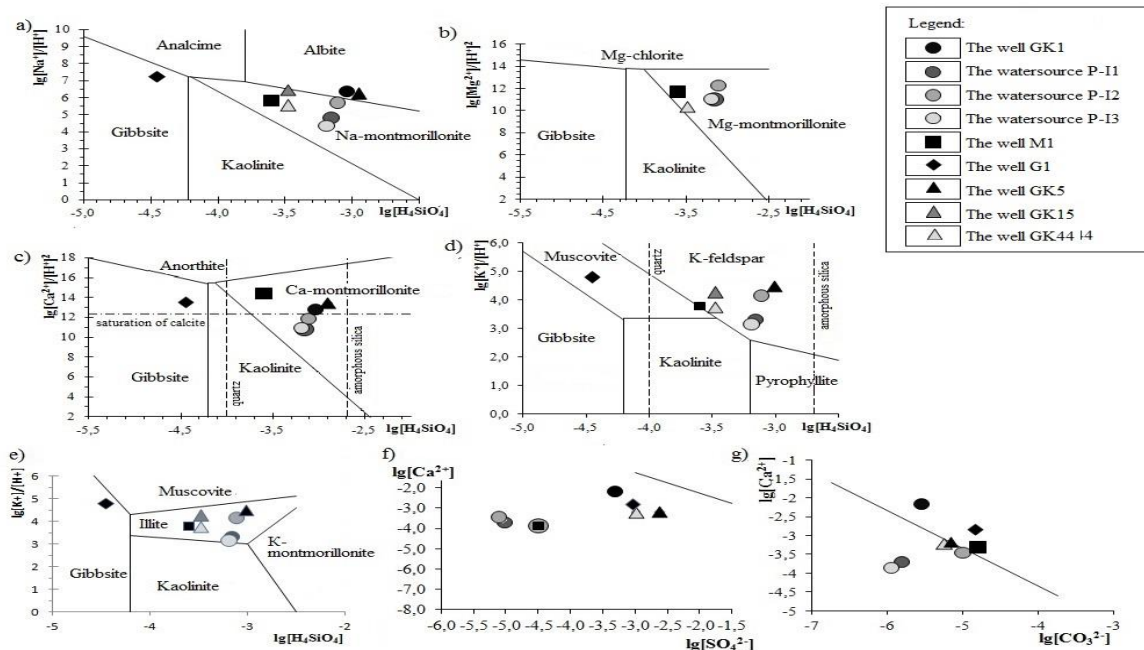
Fig. Equilibrium diagram of underground water considered hydrogeological well and watersource with aluminosilicate minerals: analcime – albite - Na-montmorillonite – kaolinite - gibbsite (a); Mg-chlorite - Mg-montmorillonite – kaolinite - gibbsite (b); anorthite - Ca-montmorillonite– kaolinite - gibbsite (c); muscovite – K-feldspar – pyrophyllite – kaolinite - gibbsite (d); muscovite – illite - K-montmorillonite – kaolinite – gibbsite (e), with anhydrite (f) and calcite (g) at the temperature of 25 degrees.

The underground water from well G1 is saturated with calcite (Fig. c, g) and muscovite (Fig. g), while groundwater to other wells is saturated with montmorillonites (Fig. a-c) and K-feldspar (Fig. d). The underground water from all wells, excluding water wells G1, is saturated with illite (Fig. e). By calcite saturated three wells - GK1, G1, M1 belonging to different hydrogeological stations. Saturation with anhydrite considered for groundwater is not typical.

It should be noted that water wells and GK1 GK5 are saturated with albite, but this is due to different reasons. For instance, well GK1 has the high value of the total mineralization of 9.8 g / l, but for well GK5 high temperature groundwater 75.5 ° C is typical. Diagram analysis (Fig) showed that interaction of underground water with water-bearing rocks has equilibrium-nonequilibrium character.

However, these groundwaters are at different stages of water-rock evolution. In general, there are three states of the groundwater interaction with water-bearing rocks.

In case of sources P-I1 and P-I3 it is the earliest of the distinguished saturation stage with Ca-montmorillonite (Fig. c).

Source P-I2 and well GK1 are in near-equilibrium state with calcite, the so-called transition zone. Finally, the water from wells G1, M1, and GK5 reached the calcite saturation stage (Fig. c, g).

The study of the equilibrium underground water showed that water is saturated with montmorillonite, some reach the calcite and albite saturation stage. The composition of underground water is characterized like colorful. Underground water in this territory is neutral, slightly alkaline and alkaline. According to salinity water varies from fresh to salt water, the temperature from cold water to very hot.

Variety of chemical composition groundwater occurs due to it confinedness to the territory of modern volcanism. High temperatures, the interaction of depth gases with water of infiltration affect the formation of water chemical composition. The considerable amount of chlorine and sodium ions is associated with nearby location of the sea area and the genetic link with marine sediments is quite probable [5].

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PATTERNS OF MERCURY DISTRIBUTION IN BOTTOM SEDIMENTS VERTICAL PROFILES PONDS (TOMSK AREA)

K.A. Gubina
Scientific advisors assistant A.Y. Ivanov, associate professor I.A. Matveenko
National Research Tomsk Polytechnic University, Tomsk, Russia

Mercury, being harmful environmental pollutant, is particularly harmful when entering water as a result of the activity of microorganisms inhabiting the bottom and the formation of water-soluble toxic organic compounds. They, in turn, are adsorbed on suspended particles and accumulate in sediments. Typical content of mercury in sediments is of 3-4 orders higher than that in water [1]. Thus, the bottom sediments (BS) are an informative part of aquatic systems from the viewpoint of assessing their sustainable pollution. Research in the vertical distribution of this element in the thickness of sediments allow defining the most intensive periods of mercury releases into the environment, which may be associated with natural conditions and with increased levels of anthropogenic stress in the study area.

Three low flow lakes of different mercury intake and accumulation were selected for the research. They are located in the south of the Tomsk Region and characterized by different remoteness from the main sources of the city anthropogenic impact, presented by enterprise of the nuclear fuel cycle, petrochemical, electronic and other types of industry [2].

Chernoe Lake is located to the north-east of the city on the River Pesochka and characterized by a high level of anthropogenic stress due to its location in the zone of Tomsk - Seversk industrial impact.

The lake in Timiryazevskoe settlement is located in the floodplain of the Tom River, about 3 km from Tomsk, its origin being oxbow.

Lake Um is located in the south-west of the city, at the distance 40 km, therefore, it is considered as a background body in the undertaken studies, because of minimal impact from the industry.

As an analytical method the atomic absorption method was used based on the software RA915P. Determination of mercury in sediments was performed by the mercury gas analyzer RA 915+ and prefix Piro - 915+. The method is based on the reduction of the combined mercury to the atomic state by pyrolysis and subsequent transfer of air from the atomizer to the analytical cell. Humus-podzolic sandy soils UDPS-3 type was used as a standard, certificate №3095 [3]. Testing was carried out to the depth of 36 cm at the intervals of 1 to 10 cm.

The pattern of mercury vertical distribution in sediment cores of low flow lakes are well reflected in the diagrams (Fig. 1. 2, 3), based on the data of the analysis, taking into account the depth of the sediments and the corresponding mercury concentration.

Mercury distribution in Lake Um corresponds to the regional background and is uniform throughout the section; local pronounced anomalies are not observed in the vertical profile. The gradual change in the composition of sediments over time is due to the natural factors.

In contrast to Lake Um, lake located in the Timiryazevskoe settlement is characterized by poorly-defined anomalies in the upper part of the sediment cores. The reason for these anomalies can be of both natural and anthropogenic character, and is associated with a periodic and irregular intake of pollutants into the lake, for example, as a result of flooding or other vertical oscillations of the water level in the lake.