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«ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫ» РҚБ
«ХАЛЫҚ» ЖҚ

ХАБАРЛАРЫ

ИЗВЕСТИЯ

РОО «НАЦИОНАЛЬНОЙ
АКАДЕМИИ НАУК РЕСПУБЛИКИ
КАЗАХСТАН»
ЧФ «Халық»

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NAS RK is pleased to announce that News of NAS RK. Series of geology and technical sciences scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of News of NAS RK. Series of geology and technical sciences in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential content of geology and engineering sciences to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы «ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы» ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Webof Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді геология және техникалық ғылымдар бойынша контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Известия НАН РК. Серия геологии и технических наук» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Известия НАН РК. Серия геологии и технических наук в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному контенту по геологии и техническим наукам для нашего сообщества.

ЧФ «ХАЛЫҚ»

В 2016 году для развития и улучшения качества жизни казахстанцев был создан частный Благотворительный фонд «Халык». За годы своей деятельности на реализацию благотворительных проектов в областях образования и науки, социальной защиты, культуры, здравоохранения и спорта, Фонд выделил более 45 миллиардов тенге.

Особое внимание Благотворительный фонд «Халык» уделяет образовательным программам, считая это направление одним из ключевых в своей деятельности. Оказывая поддержку отечественному образованию, Фонд вносит свой посильный вклад в развитие качественного образования в Казахстане. Тем самым способствуя росту числа людей, способных менять жизнь в стране к лучшему – профессионалов в различных сферах, потенциальных лидеров и «великих умов». Одной из значимых инициатив фонда «Халык» в образовательной сфере стал проект Ozgeris powered by Halyk Fund – первый в стране бизнес-инкубатор для учащихся 9-11 классов, который помогает развивать необходимые в современном мире предпринимательские навыки. Так, на содействие малому бизнесу школьников было выделено более 200 грантов. Для поддержки талантливых и мотивированных детей Фонд неоднократно выделял гранты на обучение в Международной школе «Мирас» и в Astana IT University, а также помог казахстанским школьникам принять участие в престижном конкурсе «USTEM Robotics» в США. Авторские работы в рамках проекта «Тәлімгер», которому Фонд оказал поддержку, легли в основу учебной программы, учебников и учебно-методических книг по предмету «Основы предпринимательства и бизнеса», преподаваемого в 10-11 классах казахстанских школ и колледжей.

Помимо помощи школьникам, учащимся колледжей и студентам Фонд считает важным внести свой вклад в повышение квалификации педагогов, совершенствование их знаний и навыков, поскольку именно они являются проводниками знаний будущих поколений казахстанцев. При поддержке Фонда «Халык» в южной столице был организован ежегодный городской конкурс педагогов «Almaty Digital Ustaz.

Важной инициативой стал реализуемый проект по обучению основам финансовой грамотности преподавателей из восьми областей Казахстана, что должно оказать существенное влияние на воспитание финансовой грамотности и предпринимательского мышления у нового поколения граждан страны.

Необходимую помощь Фонд «Халык» оказывает и тем, кто особенно остро в ней нуждается. В рамках социальной защиты населения активно проводится

работа по поддержке детей, оставшихся без родителей, детей и взрослых из социально уязвимых слоев населения, людей с ограниченными возможностями, а также обеспечению нуждающихся социальным жильем, строительству социально важных объектов, таких как детские сады, детские площадки и физкультурно-оздоровительные комплексы.

В копилку добрых дел Фонда «Халык» можно добавить оказание помощи детскому спорту, куда относится поддержка в развитии детского футбола и карате в нашей стране. Жизненно важную помощь Благотворительный фонд «Халык» оказал нашим соотечественникам во время недавней пандемии COVID-19. Тогда, в разгар тяжелой борьбы с коронавирусной инфекцией Фонд выделил свыше 11 миллиардов тенге на приобретение необходимого медицинского оборудования и дорогостоящих медицинских препаратов, автомобилей скорой медицинской помощи и средств защиты, адресную материальную помощь социально уязвимым слоям населения и денежные выплаты медицинским работникам.

В 2023 году наряду с другими проектами, нацеленными на повышение благосостояния казахстанских граждан Фонд решил уделить особое внимание науке, поскольку она является частью общественной культуры, а уровень ее развития определяет уровень развития государства.

Поддержка Фондом выпуска журналов Национальной Академии наук Республики Казахстан, которые входят в международные фонды Scopus и Wos и в которых публикуются статьи отечественных ученых, докторантов и магистрантов, а также научных сотрудников высших учебных заведений и научно-исследовательских институтов нашей страны является не менее значимым вкладом Фонда в развитие казахстанского общества.

С уважением,
Благотворительный Фонд «Халык»!

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SOIL CONDITION STUDIES IN THE AREA OF THE TENGIZ DEPOSIT

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Abstract. The study of the ecological state of soils on the Caspian Sea coast in the area of the Tengiz field is of great practical importance. It is necessary for the control over an ecological condition of soils and an estimation of a degree of its pollution on the present position. Morphological description of soils by horizons, granulometric composition, physical and chemical properties of soil by horizons and content of oil products have been studied. The obtained outcomes will act as an initial stage in analyzing polluted soil due to an oil spill. Additionally, it will offer a dependable evaluation of the extent and rate of pollution. The observation process involved employing commonly accepted techniques and methods. The soils of the study area are represented by sandy, sandy

loam and light loam varieties. The thickness of the humus horizon was not high, the cation exchange capacity of the soils was <5 mg-eq/100 g, the content of physical clay in the surveyed soils did not exceed 10 %. The oil content is below the permissible level. The study concludes that no impact of the Tengiz deposit on the environmental condition of soils inthe coastal zone of the Caspian Sea has been identified.

Keywords: soil, granulometric composition, physico-chemical properties, oil products, Tengiz fields, Caspian Sea coast

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ТЕҢІЗ КЕН ОРНЫ АУДАНЫНДАҒЫ ТОПЫРАҚТЫҢ ЖАЙ-КҮЙІН ЗЕРТТЕУ

Аннотация. Теңіз кен орны ауданы маңындағы Каспий теңізінің жағалауындағы топырақтың экологиялық жағдайын зерттеу үлкен практикалық маңызға ие. Бұл топырақтың экологиялық жағдайын бақылау және олардың қазіргі жағдай бойынша ластану дәрежесін бағалау үшін қажет. Горизонт бойынша топырақтың морфологиялық сипаттамасы, гранулометриялық құрамы, топырақтың физика-химиялық қасиеттері және мұнай өнімдерінің құрамы зерттелді. Нәтижелер мұнайдың төгілуі нәтижесінде ластанған топырақты талдаудың бастапқы мәліметі бола алады. Сонымен қатар, бұл ластану ауқымы мен жылдамдығын сенімді бағалауға мүмкіндік береді. Бақылау процесі жалпы қабылданған әдістер мен амалдарды қолдануды қамтыды. Зерттелетін аймақтың топырағы құмды және жеңіл сазды сорттармен ұсынылған. Қарашірік горизонтының қалыңдығы аз болды, топырақтың катион алмасу қабілеті <5 мг-экв/100 г құрады, зерттелген топырақтағы физикалық саздың мөлшері 10 % – дан аспады. Мұнайдың мөлшері рұқсат етілген деңгейден төмен. Зерттеуде Теңіз кен орнының Каспий теңізінің жағалау аймағындағы топырақтың экологиялық жағдайына ешқандай жағымсыз әсері анықталмағаны туралы қорытынды жасалады.

Түйін сөздер: топырақ, гранулометриялық құрамы, физика-химиялық қасиеттері, мұнай өнімдері, Теңіз кен орыны, Каспий теңізі жағалауы

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ИССЛЕДОВАНИЯ СОСТОЯНИЯ ПОЧВ В РАЙОНЕ МЕСТОРОЖДЕНИЯ ТЕНГИЗ

Аннотация. Изучение экологического состояния почв на побережье Каспийского моря в районе месторождения Тенгиз имеет большое практическое значение. Оно необходимо для контроля, за экологическим состоянием почв и оценки степени их загрязнения. Проведены морфологическое описание почв по горизонтам, изучены гранулометрический состав, физико-химические свойства почв и содержания нефтепродуктов. Результаты исследования послужат точкой отсчета при исследовании загрязненных почв в случае аварийного разлива нефти, а также позволят достоверно определить темпы и степень их загрязнения. При проведении наблюдений были использованы общепринятые методики и методы. Почвы исследуемой территории представлены песчаными, супесчаными и легкосуглинистыми разновидностями. Мощность гумусового горизонта была невысокой, емкость катионного обмена в почвах <5 мг-экв/100 г., содержание физической глины в обследованных почвах не превышало 10%. Содержание нефтепродуктов ниже допустимого уровня. Из результатов исследования следует вывод, что влияние месторождения Тенгиз на экологическое состояние почв прибрежной зоны Каспийского моря не выявлено.

Ключевые слова: почва, гранулометрический состав, физико-химические свойств, нефтепродукты, месторождения Тенгиз, побережье Каспия

Introduction

Environmental protection and environmental security of the Caspian Sea and its coastal zones are reflected in the main directions of economic and social development of the Republic of Kazakhstan for the period until 2050 (Environmental Code, 2021).

In recent years, the environmental situation in the Kazakhstan sector of the North Caspian Sea has been deteriorating. Anthropogenic impacts on the marine and coastal ecosystem of the Caspian Sea have increased significantly, facilitated by the development of oil and gas fields by all Caspian littoral states (Baibotayeva et al., 2021; Kenzhegaliev et al., 2019; Kenzhegaliev et al., 2021; Sokolskiy et al., 2021). Tengizchevroil (TCO) is developing Kazakhstan's largest oil field, Tengiz, on the shores of the Caspian Sea. This field, with its high hydrogen sulphide and mercaptan content, also experiences periodic accidents and hydrocarbon leaks. In recent years, environmental disasters have occurred in this sector of the Caspian Sea, with mass deaths of seals, fish and birds, and an increasing incidence of disease.

For example, in 1986, emergency oil and gas blowouts from well No. 37 at the Tengiz field lasted for more than a year, killing hundreds of thousands of birds, dramatically increasing morbidity of the population, etc. (Diarov et al., 2004; Novikov et al., 2010).

In 2019, researchers from Non-profit JSC "Atyrau Oil and Gas University named after Safi Utebayev" collaborated with LLP "Kazakhstan Agency of Applied Ecology" to conduct a research project focused on the "Background condition of the coastal strip of the north-western part of Kazakhstan". This study was carried out as part of the "National Plan for Oil Spill Prevention and Response in the Sea and inland water bodies of the Republic of Kazakhstan" and "National Plan for preparedness and response to oil spills at sea, inland water bodies and in the protection zone of the Republic of Kazakhstan" (Kanbetov et al., 2022; The report, 2019).

The aim of the research is to study the ecological condition of the coastal zone of the north-eastern part of the Kazakh sector of the Caspian Sea (Kenzhegaliyev et al., 2010; *Gilazhov* et al., 2020; Johnston et al., 2003; Pogrebov et al., 2010; Kanbetov et al., 2022).

One of the objectives of the research work was to investigate the ecological condition of soils in the coastal zone of the Caspian Sea in the area of the Tengiz field.

Soil studies include:

· morphological description of soils by horizon;

· study of the particle size distribution;

· Study of soil physico-chemical properties by horizon (humus, gross nitrogen and phosphorus content, pH, absorption capacity and composition of exchangeable cations, quantity of water-soluble salts);

· sampling for the study of petroleum content.

Materials and basic methods

The main focus of this study is to investigate the soils in the coastal region of the Caspian Sea, specifically in the Tengiz field situated in the Zhylyoi district of Atyrau oblast in the Republic of Kazakhstan.

In order to conduct this research, the researchers collected soil samples from the coastal monitoring stations located above the shoreline. These stations were positioned perpendicular to the coastline and along profiles, consisting of one station at the water's edge, along with two additional stations at a distance of 1000 and 5000 meters. In this work, the soil samples collected at the station located at a distance of 1000 metres were examined (Figure 1 and Table 1).

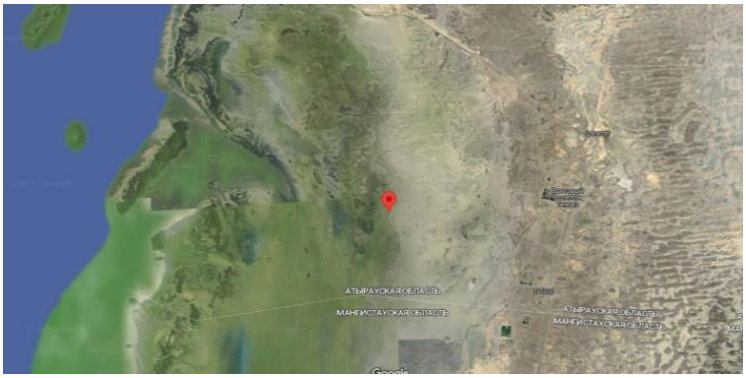

Figure 1- Satellite image of the study area

Table 1-Soil sampling coordinates

Soil type	Latitude	Longitude
Saline meadow soils	46° 37' 35.996" N	53° 2' 6.152" E

When conducting observations, generally accepted methods and techniques were used.

Soil sampling and description of soil horizons were performed on-site in the field, with subsequent laboratory analysis of the collected soil samples to follow.

Within the study area, a standard 10 m x 10 m plot was designated for soil sampling in order to assess oil content. Spot samples were obtained from both the corners and center of the site at a depth of 0–5 cm and 5–20 cm, in compliance with regulatory requirements outlined in GOST 17.4.3.01–2017, GOST 17.4.4.02–2017, Instructions for sampling to control soil contamination with oil and petroleum products, and NCOC N.V. Guidelines for field work: "Baseline environmental studies and industrial environmental monitoring: field work. Revision A01. December 2016" HSE-H34-PR-0001-000.

For quantitative assessment of the degree of soil contamination of the Caspian Sea coastline with oil and oil products the "Ecological requirements in the field of protection and use of land resources (including agricultural lands)", approved by Order No. 62-p of the Minister of Environmental Protection of the Republic of Kazakhstan dated 21 February 2005, which defines five levels of soil pollution (Table 2) were used.

Table 2- Indicators of land pollution by chemicals

Element, Connection	Content (mg/kg) corresponding to pollution level				
	Level 1 admissible	Level 2 low	Level 3 medium	Level 4 high	Level 5 lofty
Oil and petroleumproducts	< MAC	1000 to 2000	2,000 to 3,000	3000 to 5000	> 5000

Research results

The current method of evaluating soil pollution is based on the regulatory sanitary and hygienic documents, which establish the maximum permissible concentrations

(MPC) of chemical elements. The Ministry of National Economy of the Republic of Kazakhstan has approved the hygienic standards of environmental safety for soil, and MPC for chemicals of soil are determined by Order No. 452 dated June 25, 2015. For pollutants not included in this order, the RND 03.1.0.3.01–96 guidelines on the procedure of rationing of volumes of formation and disposal of production wastes are used.

The soil type in the studied area belongs to the salt marsh meadow soils, distributed on the second seaside terrace in combinations of slope salt marsh soils and independent contours. They are formed in conditions of high, surface moistening on highly saline groundwater (1.5–2.5 m). They are characterized by alternation of periods of high watering with periods of drying out and back rise of capillary water from soil surface with subsequent accumulation of salts in it. For salt marshs, the main defining feature is the abundant excretion of salts on the soil surface (dry residue exceeding 1 %).

The soil-forming rocks are clays and heavy loams with inter-layers at some depth from the surface of the loam with large quantities of shells. The decomposed and semi-decomposed reed remains in the upper horizons indicate a past marsh stage of these soils (Figure 2 and Table 3).

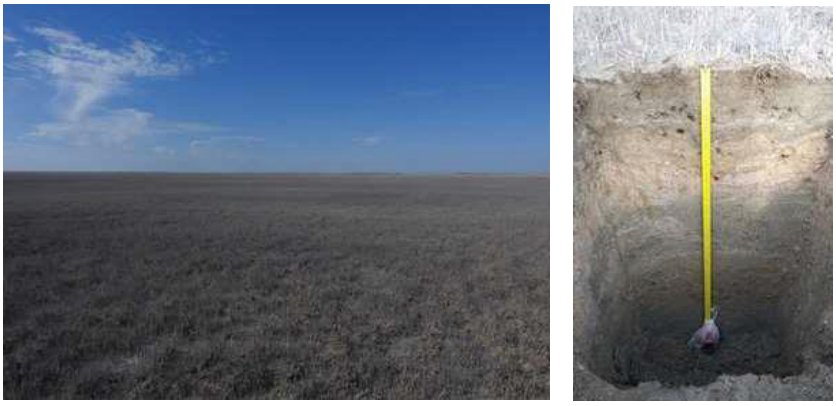

Figure 2- Saline meadow soils

The cut is set 2 km east of the sea shoreline. The vegetation consists of a reed-solerosedge community: Kalidium caspicum, sarsazan (halocnemum), salsola of the genus suaeda with the participation of a reed. Projective coverage is 90 %. The surface is dotted with marine barnacles, in some places dissected by shallow cracks. Dredging from the surface and throughout the profile.

Table 3 - Description of soil genetic horizons

Depth	Breed description
0–9 cm	Brownish-grey, sandy, fresh, sparsely compacted, with frequent plant roots with reed rootstocks, sodded, granular-coarse-grained structure, transition to the next horizon is sharp incolour and mechanical composition.
9–18 cm	Grey, sandy loam, moist, weakly compacted, unstructured, pervaded by reed roots, inclusionsof carbonates, small sparse scrap shells as inclusions, transition to the next horizon clear in colour.

18–34 cm	Pinkish-pale sand, half consisting of debris of sea shells, moist, loose, rusty patches and stains,sparse reed rhizomes The transition to the next horizon is sharp in colour and mechanical composition.
34–56 cm	Grey with a greenish tinge, medium-loamy, weakly compacted, damp, unstructured, sparse plant roots, single rusty spots, inclusions of scrap shells, transition to the next horizon cut incolour and mechanical composition.
56–78 cm	Brownish grey, sandy loam, damp, unstructured, broken shells present, accumulations of soluble salts are visible, the transition to the next horizon is sharp in colour.
78–100 cm	A bluish-blue sandy loam, damp, unstructured, gleyed, containing small amounts of broken shell, pitting accumulations of water-soluble salts.

The general name of the soil by its mechanical composition is given by the granulometricanalysis of the upper horizon (Table 4).

Table 4 - Classification of soils by granulometric composition

№	Name of soils by granulometric composition	Designations	Particle content <0.01 mm (%)
1	Heavy clay	HC	>85
2	Medium clay	MC	75–85
3	Light clay	LC	60–75
4	Heavy loam	HL	45–60
5	Mid-loam	M	30–45
6	Light loam	LL	20–30
7	Sandy loam	SL	10–20
8	Sandy	S	5–10
9	Loose sand	LS	0–5

The results of the study of the physico-chemical composition and properties of the soilsare shown in Tables 5 to 7.

Table 5 - Results of the physico-chemical composition of soils

Soil type	Name of soils bygranulometric of the composition	Physical and chemical properties of soil	Type of watermode
Meadow salt marshes	Loose sand,sandy loam,sandy, light loamy or medium-loam	Humus horizon thickness 0-5 cm, humus content less than 0.07 %–1.7 %, cation exchange capacity <5 mg-eq/100g, physical clay content <10%	Unflushed

Table 6 - Physico-chemical properties of soils

Soil type	Depth selection, cm	pH	Humus, %	Nitrogen total, %	Phosp-horus gross, %	Content, mg-eq per 100 g				
						Exchangeable cations				Capacity cation exchange
						Na	K	Ca	Mg	
Saline meadow soils	0-9	8,20	4,6	0,232	0,049	39,6	2,6	24,0	31,0	49,6
	9–18	7,93	0,57	0,053	0,032	9,5	1,3	21,3	11,0	27,6
	25–30	8,20	<0,07	<0,008	0,033	4,0	0,20	0,75	1,0	6,8
	40–50	7,45	0,64	0,040	0,077	22,8	1,9	22,3	17,3	68,8

	60–70	8,10	<0,07	<0,008	0,024	14,4	0,91	6,5	10,0	33,8
	85–95	8,50	<0,07	<0,008	0,039	15,4	0,93	19,9	8,8	47,4

The humus content in the humus horizon is 1.3–4.6 %, declining sharply down the profile.

The level of total nitrogen varies from low to high, gross phosphorus mostly low, rarelyhigh. The reaction of the soil solution is slightly alkaline to alkaline, with a pH of 7.45–8.5.

The cation exchange capacity in meadow salt marshes varies within a wide range of 6.8–49.6 mg-eq per 100 g of soil, which is mainly in the upper soil horizons.

The soil exchange complex is saturated with calcium and magnesium cations. Exchangeable sodium is low (<0.73 mg-eq. per 100 g), although in some cases its elevated content in the absorbed complex is noted. However, the solonetz process in these soils is hampered by light granulometric composition, many inclusions of barnacles and strong salinity.

Table 7 - Anion and cation composition of soils

Soil type	Depth selection, sm	Component content, mg/eq per 100 g								Amount salts	*Salinity type		Level of salinity
		Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4	%	by anions	cations	
Salt marshes grasslands soils	0–9	14,3	22,3	65,9	1,1	<0,04	0,32	76,36	27,95	5,96	C	S	very strong
	9–18	10,0	10,0	29,3	0,63	<0,04	0,18	29,28	16,68	2,68	SC	S	
	25–30	1,3	2,3	5,1	0,13	<0,04	0,26	6,26	2,25	0,45	C	S	strong
	40–50	10,0	8,5	31,8	0,62	<0,04	0,22	30,90	19,44	3,30	SC	S	very strong
	60–70	4,0	5,0	20,1	0,46	<0,04	0,26	20,40	9,27	1,76	SC	S	
	85–95	10,0	6,1	21,3	0,50	<0,04	0,22	23,10	16,06	2,43	SC	S	

*C - chloride, SC - sulphate-chloride, S - sodium.

A feature of meadow salt marshes is the very high content of readily soluble salts in the soil profile of 0.45–5.96 % with a maximum in the surface horizons.

Sulphate-chloride chemistry predominates, with chloride-sulphate and chloride types in the surface layer. Among cations, sodium and potassium dominate. The degree of salinity of the soil profile varies from strong to very strong.

The soil profile of meadow salt marshes is heterogeneous in terms of granulometric composition, layered, sometimes layers are completely composed of shell rock. While sandy and sandy loam deposits predominate, there is often an alternation with loam horizons (Table 8).

Table 8 - Granulometric composition of soils

Soil type	Depth selection,cm	Fractional content, %													Sum of fractions <0,01	*Name of soilsby pellet metric composition
		Fractional size, mm					sand				dust			slu-dge		
		>200	200-10	10-5	5-2	2-1	1-0,5	0,5-0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,005	0,005-0,001	<0,001		
Saline meadow soils	0–9	0,1	0,1	0,1	0,27	2,19	6,30	13,36	13,73	21,69	32, 78	2,17	1,79	5,74	9, 69	S
	9–18	0,1	0,1	0,1	1,40	3,58	4,21	19,80	25,66	16,18	13, 14	5,85	6,45	3,70	16, 01	SL
	25–30	0,1	0,1	2, 12	2,76	5,68	3,39	35,82	45,04	2,73	<0,1	0,35	0,93	1,17	2, 45	LS
	40–50	0,1	0,1	<0, 1	1,24	11, 42	0,64	4,04	18,62	13,81	19, 84	24, 74	3,26	2,39	30, 39	M
	60–70	0,1	0,1	0, 20	1,07	5,14	7,99	14,49	38,50	12,73	2, 08	1,82	8,96	7,01	17, 78	SL
	85–95	0,1	0,1	1, 42	0,36	1,04	0,93	4,06	51,42	19,96	3, 40	13, 48	1,96	1,96	17, 40	SL

*See table 4.

Soil contamination of the Kazakhstan sector of the Caspian Sea by oil and oil products in the area of the Tengiz field is below the requirements of permissible levels (Table 9).

Table 9 - Petroleum product content in soils

Soil type	Depth of selection, sm	Petroleum product content	
		mg/kg	shares of PL
Saline meadow soils	0–5	<1,0	<0,001
	5–20	<1,0	<0,001
Permissible level (PL):	1000		
The detection limit of the method:	1,0		

Discussion

In the north-eastern Caspian Sea region, environmental studies have been repeatedly conducted (Report, 2017; Report, 2018; The current, 2019). Previous research on soil resistance to anthropogenic influences in the Caspian Sea region has been conducted and published in a collaborative effort between Tyumen Industrial University and S. Yesenov Caspian State University of Technology and Engineering (Erokhina et al., 2018, Kenzhetaev et al., 2018; Kenzhetaev et al., 2019). In addition, the Kazakh Research Institute of Soil Science and Agrochemistry, named after U.U. Uspanov, has developed a scale of soil resistance to anthropogenic influences based on field observations and genetic analysis of soils in the coastal zone of the Northern Caspian Sea. The resulting maps of soil resistance to mechanical and petrochemical influences were created using geoinformation technologies and remote sensing data.

Conclusion

Soils in the Tengiz area are sandy, sandy loam and light loam varieties. They have a horizon consisting of shell debris, often with loam interlayers, closely underlain by variegated sandy loam and various types of loam.

Permeability depends almost exclusively on the mechanical composition and composition, as pore size is determined by particle size and density. During the onset of cold weather in the north-eastern Caspian coastal area, heavily wetted frozen coastal soils lose their permeability.

The physical and chemical composition of soils in the study area mainly depends on the thickness and % of humus content, the capacity of the cationic composition, the content of physical clay. According to the survey, the thickness of the humus horizon was not high 0–5 cm.

In terms of cation exchange capacity the figures were <5 mg-eq/100 g in soils. The content of physical clay in the surveyed soils did not exceed 10 %.

According to the results of the survey, no chemical contamination of the soil was found.

Oil product content in coastal soils at 0.003–0.012 fractions of the permissible level indicates that there is no oil contamination of coastal soils.

The results of laboratory analyses suggest that the impact of anthropogenic factors on the ecological state of soils in the coastal zone of the Caspian Sea in the area of the Tengiz field has not been identified.

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