

Ministry of Energy of the Republic of Kazakhstan



Republic State Enterprise "Kazhydromet"

**ACTIVITY OF NATIONAL
HYDROMETEOROLOGICAL SERVICES OF
THE KAZAKHSTAN
IN THE CASPIAN SEA REGION D
2017 - 2018**

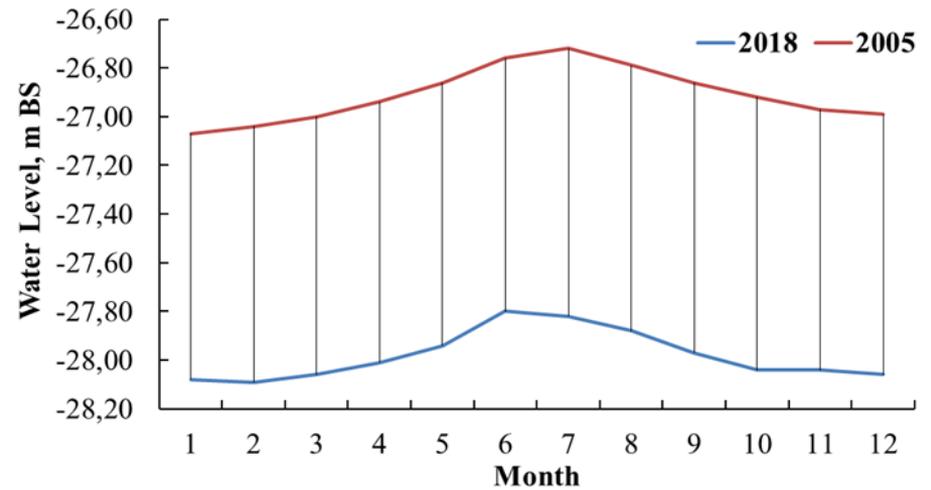
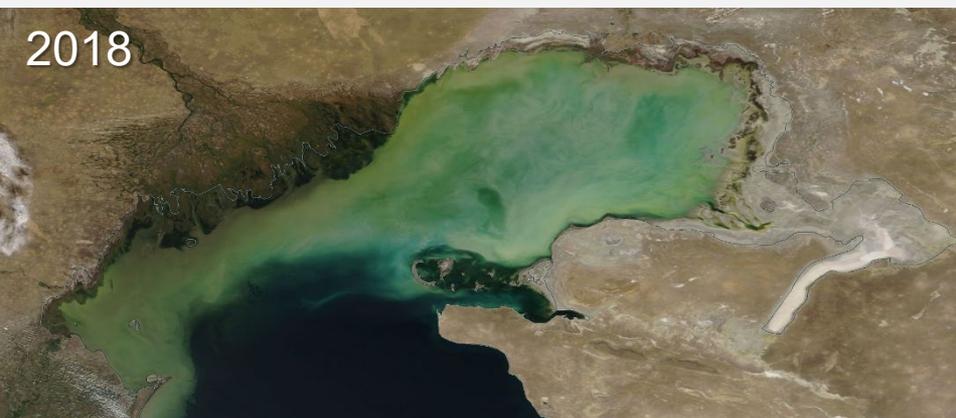
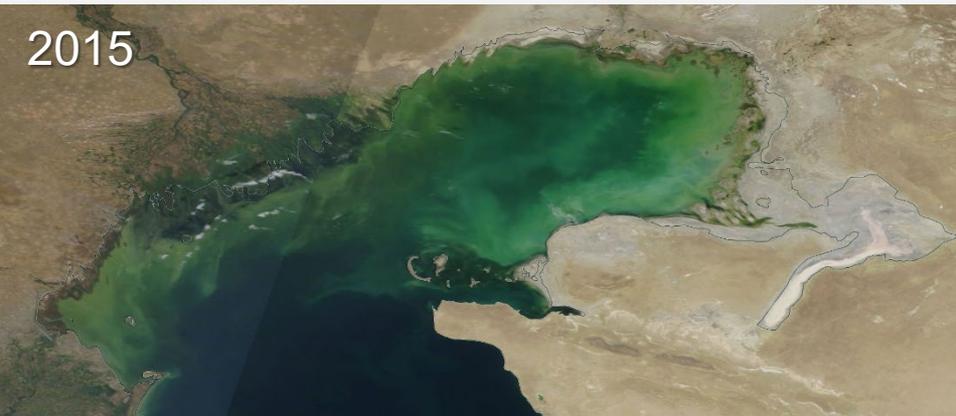
***3-th (23) Session CASPCOM,
Ashgabat 30-31 October 2018***

Hydrometeorological monitoring



Marine observations at four sea hydrometeorological stations are made: Peshnoy, Island Kulaly, Fort -Shevchenko, Aktau and six sea hydrological posts: Zhanbay, Igolkinskay banka, Fetisovo, Kuriyk, Saura and Peschaniy.

Hydrometeorological monitoring



Hydrometeorological monitoring

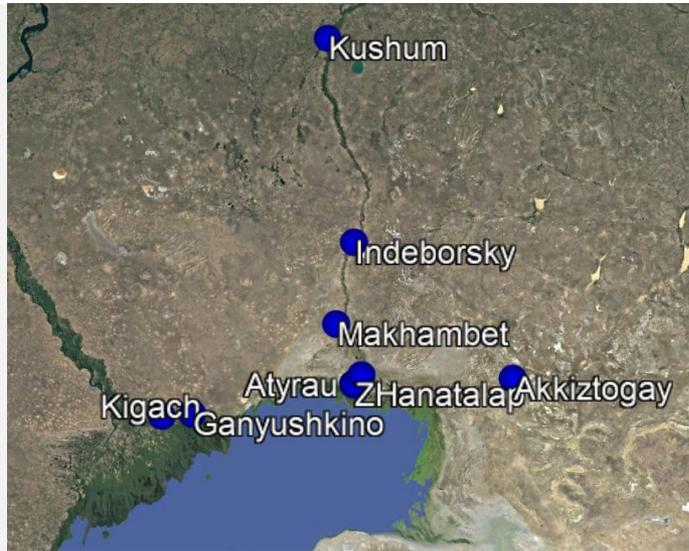
| N | Name | Water level | Wave | Water temperature | Salinity | Ice phenomena | | Visual observations of water pollution | Air temperature | Atmospheric phenomenon | Precipitation | Snow cover |
|----|-------------------|-------------|------|-------------------|----------|---------------|--|--|-----------------|------------------------|---------------|------------|
| | | | | | | Ice condition | Thickness of ice and height of snow on ice | | | | | |
| 1 | Fetisovo | + | + | + | + | | | + | + | + | | |
| 2 | Saura | + | + | + | + | | | + | + | + | | |
| 3 | Peschaniy | + | + | + | | | | + | + | + | | |
| 4 | Kuriyk | + | + | + | | | | + | + | + | | |
| 5 | Zhambay | + | | + | + | + | + | + | + | + | | |
| 6 | Igolkinskya banka | + | | + | + | + | + | + | + | + | + | + |
| 7 | Peshnoy | + | | + | + | + | + | + | | | + | + |
| 8 | Aktau | + | + | + | + | | | + | | | | |
| 9 | Fort-Shevchenko | + | + | + | + | + | + | + | | | | |
| 10 | Island Kulaly | + | + | + | + | + | + | + | | | | |

Storm surges on the Caspian Sea (2017 – September, 2018)

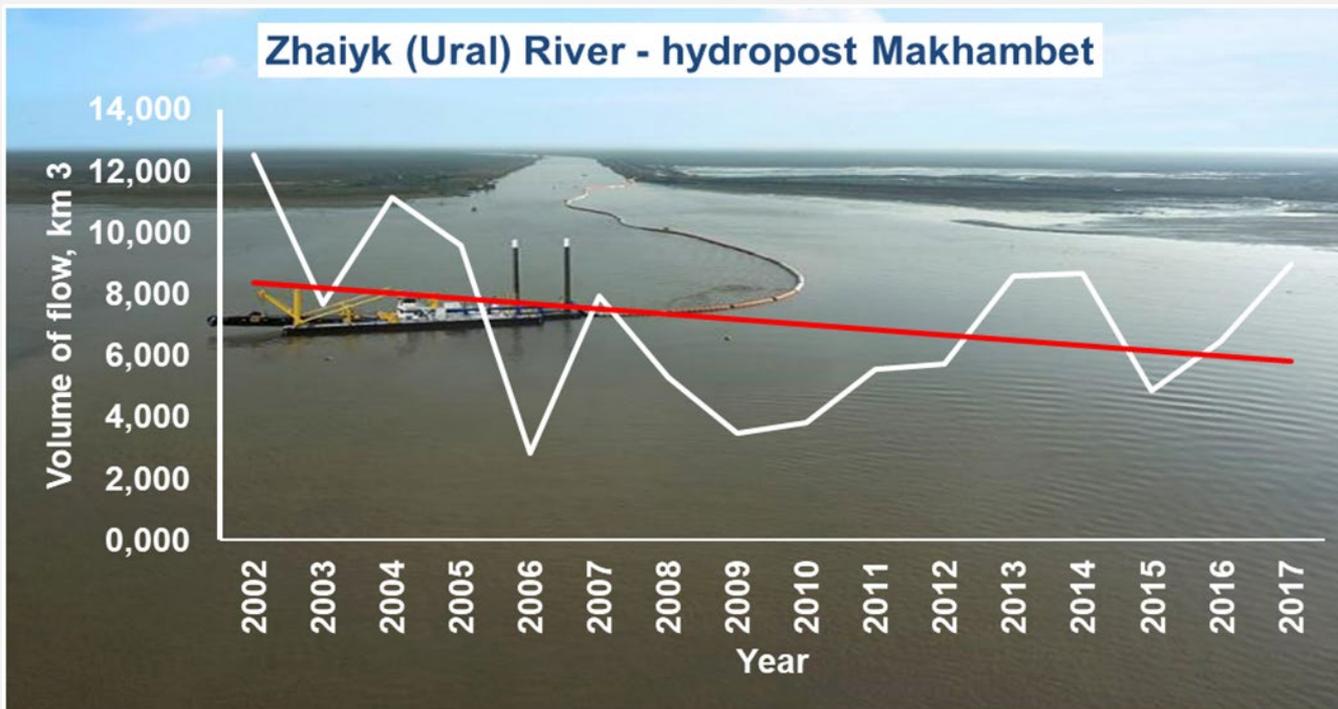
| Point | 2017 | | 2018 (1-9) | | Total |
|-----------------|------------|--------------|------------|--------------|------------|
| | Wind setup | Wind setdown | Wind setup | Wind setdown | |
| Zhambay | 0 | 1 | 0 | 0 | 1 |
| Peshnoy | 13 | 19 | 20 | 17 | 69 |
| Island Kulaly | 0 | 1 | 1 | 2 | 4 |
| Fort-Shevchenko | 7 | 14 | 3 | 2 | 26 |
| Saura | 7 | 11 | 9 | 10 | 37 |
| Peschany | 1 | 2 | 0 | 0 | 3 |
| Aktau | 2 | 3 | 2 | 3 | 10 |
| Fetisovo | 3 | 16 | 1 | 5 | 25 |
| Total | 33 | 67 | 36 | 39 | 175 |



Hydrological monitoring

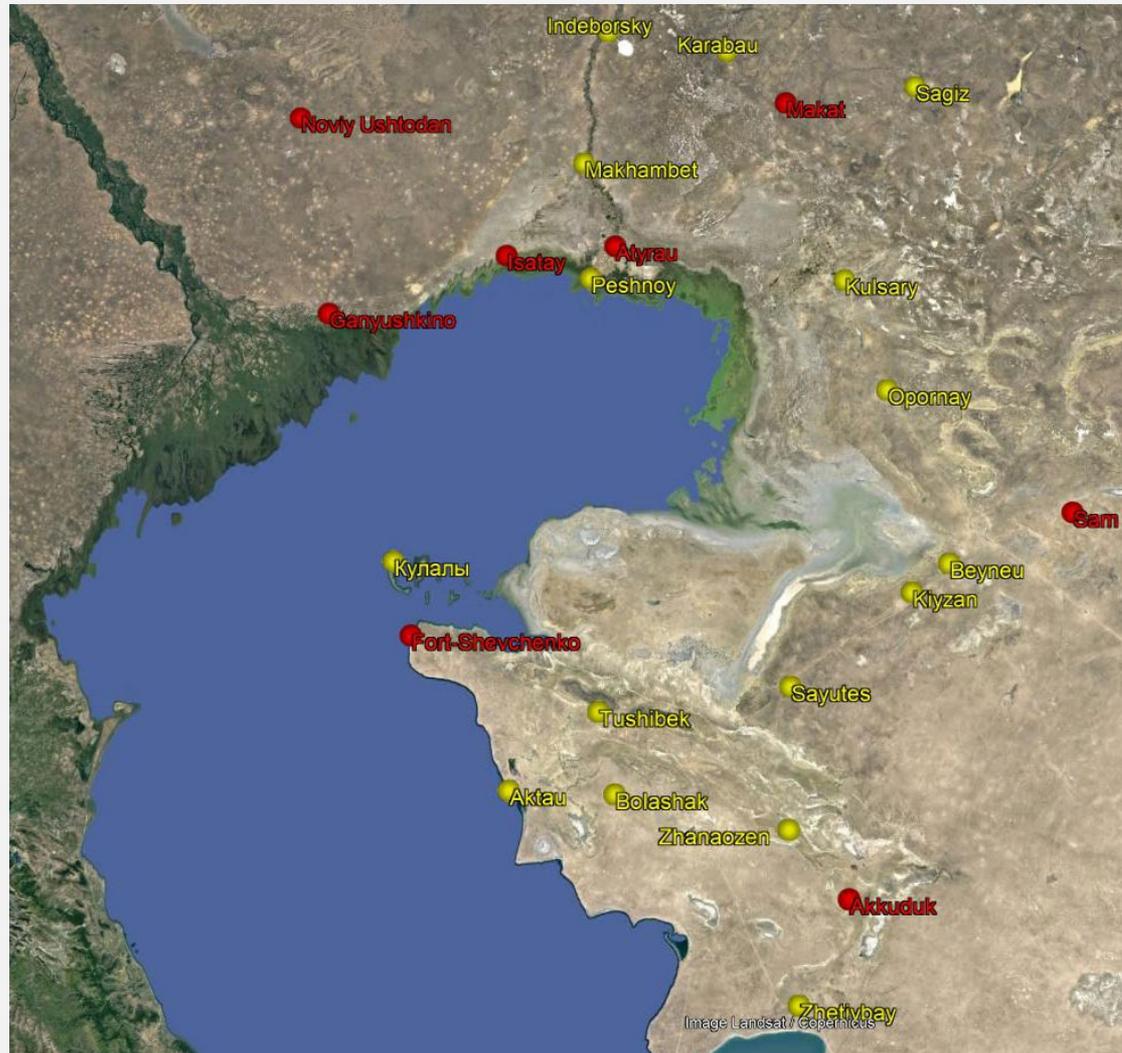


Hydrological network: Zhaiyk River – post Kushum, Zhaiyk River – post Indeborsky, Zhaiyk River – post Makhambet, Zhaiyk River – post Atyrau; Yaik Channel – post Erkenkala, Zolotoy rukav Channel – post Zhanatalap, Kigach Channel – post Kotyaevka, Sharonovka Channel – post Ganyushkino, Emba River – post Akkiztogay.



Meteorological monitoring

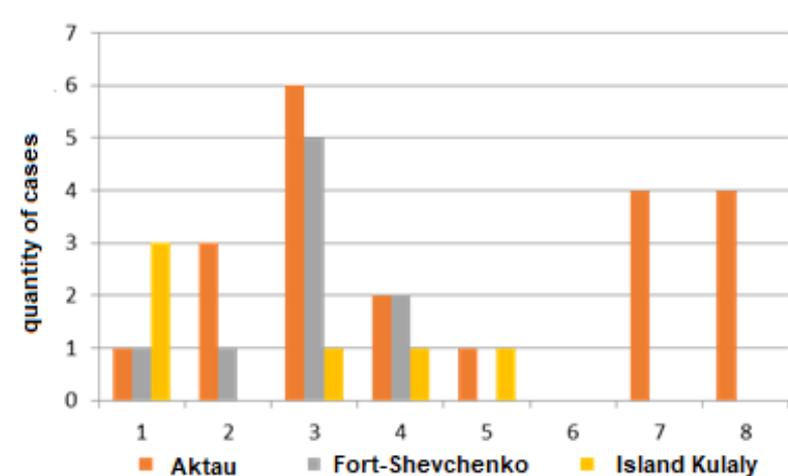
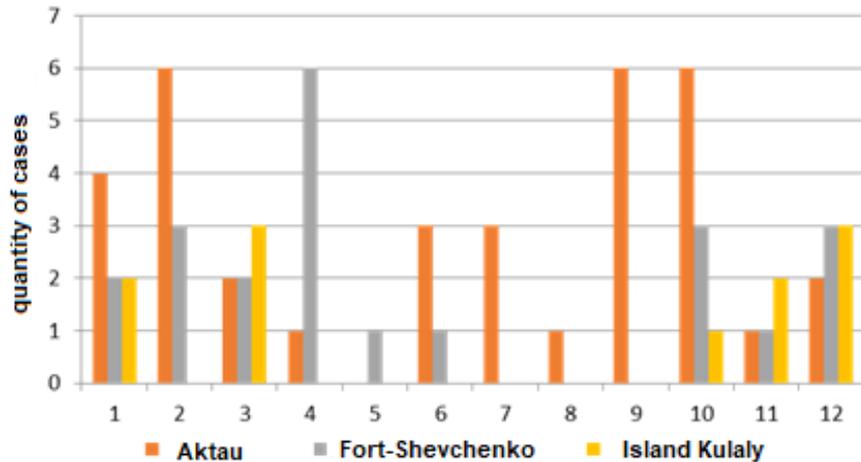
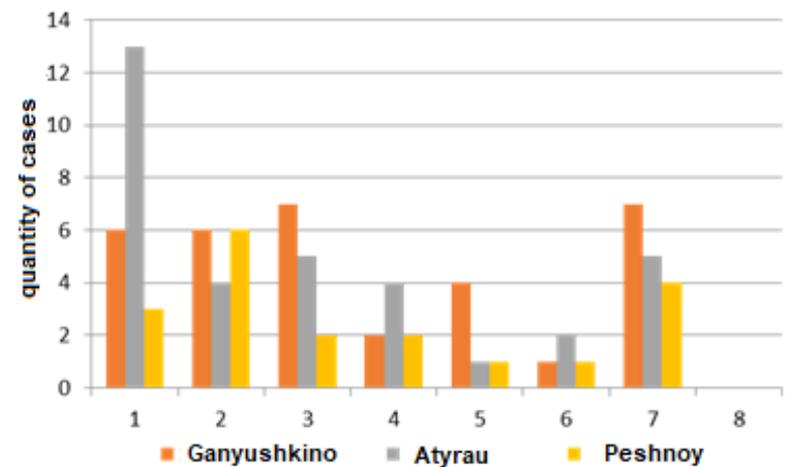
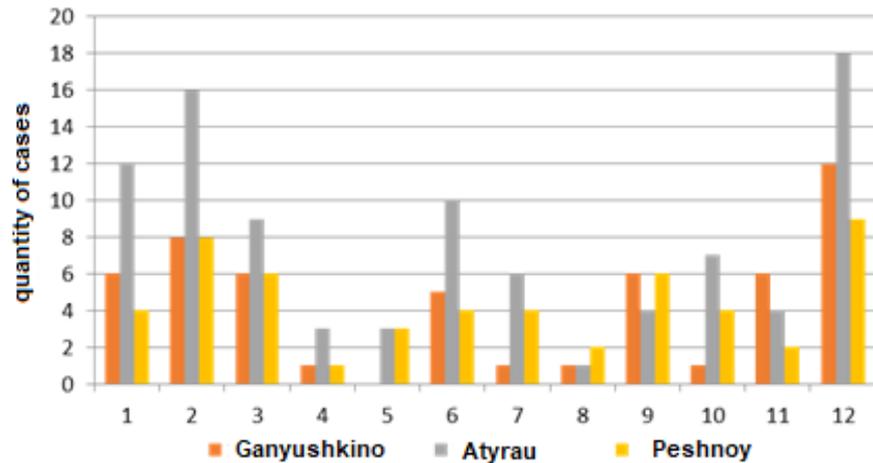
The meteorological network in the Caspian Region consists of 24 meteorological stations, 8 of which are stations of the international exchange (Atyrau, Noviy Ushtogan, Ganyushkino, Makat, Isatay, Sam, Fort- Shevchenko, Akkuduk).



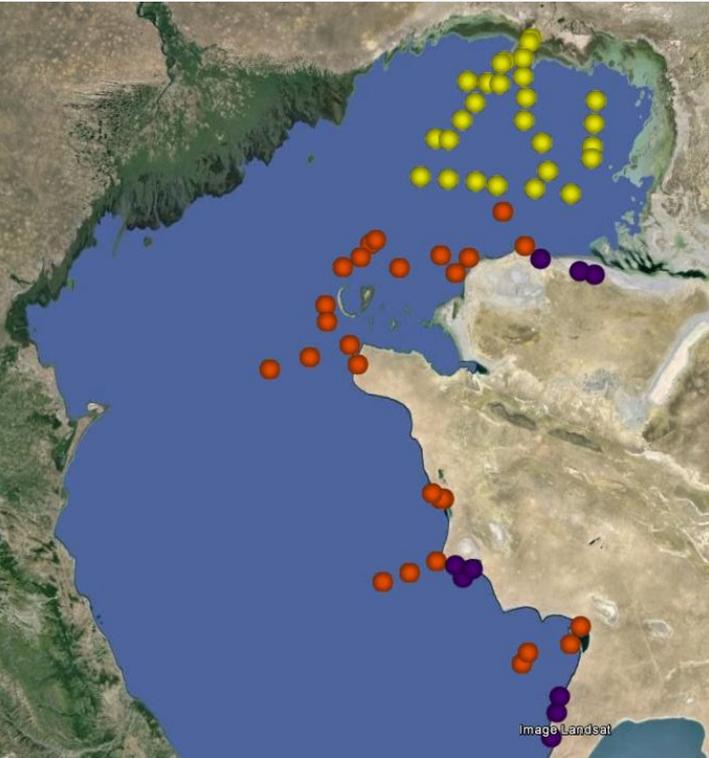
Frequency of a dangerous meteorological events (2017 - August, 2018)

2017

2018



Sea water and sediment monitoring



Sampling points of sea waters in the territory of "Seaport of Aktau"

Water Quality is observed in 31 points.

Water quality is determined by 46 indicators:

Temperature, Turbidity, Alkalinity, pH, Conductivity, Suspended matters, solid residue, Chemical Oxygen Demand, Water hardness, Dissolved oxygen, % oxygen saturation, Chlorides, Sulfates, Hydrocarbonates, Carbonates, Calcium, Magnesium, Sum of ions, BOD₅, Ammonium Salt, Nitrite nitrogen, Nitrate nitrogen, Sum of nitrogen, Phosphates, Total Phosphorus, Total Iron, Silicon, Phenol, Sodium, Potassium, Oil products, Anionic active agents, Lead, Copper, Zinc, Total Chrome, Chrome (6+), Chrome (3+), Fluorides, Boron, Mercury, Cobalt, Nickel, Manganese, Hydrogen sulfide, Cadmium.

Sediment Monitoring is observed 2 times per year (in the spring and autumn) in 37 points.

Is defined the following indicators: Oil products, Copper, Chrome (6+), Cadmium, Nickel, Manganese, Lead, Zinc.

Results of water Quality monitoring in 2017

| Name of object | Index of impurity of water and water quality | Pollutant content | | |
|----------------|--|--------------------|---|----------------------|
| | | Quality indicators | Average concentration, mg/dm ³ | Кратность превышения |
| Caspian Sea | 8,7 (normative clean water) | Dissolved oxygen | 8,7 | |
| | 2,95 (normative clean water) | BOD ₅ | 2,95 | |
| | 0,00 (normative clean water) | | | |

Water temperature – 2,0...24,7°C, hydrogen ion exponent – 7,95, dissolved oxygen – 8,7 mg/dm³, BOD₅ – 2,95 mg/dm³. Increase of MPC isn't revealed. In comparison with 2016 the water quality hasn't changed.

Results of water Quality monitoring in the first half of the year 2018

| Name of object | Index of impurity of water and water quality | Pollutant content | | |
|----------------|--|--------------------|---|----------------------|
| | | Quality indicators | Average concentration, mg/dm ³ | Кратность превышения |
| Caspian Sea | 9,94 (normative clean water) | Dissolved oxygen | 9,94 | |
| | 2,22 (normative clean water) | BOD ₅ | 2,22 | |
| | 0,00 (normative clean water) | | | |

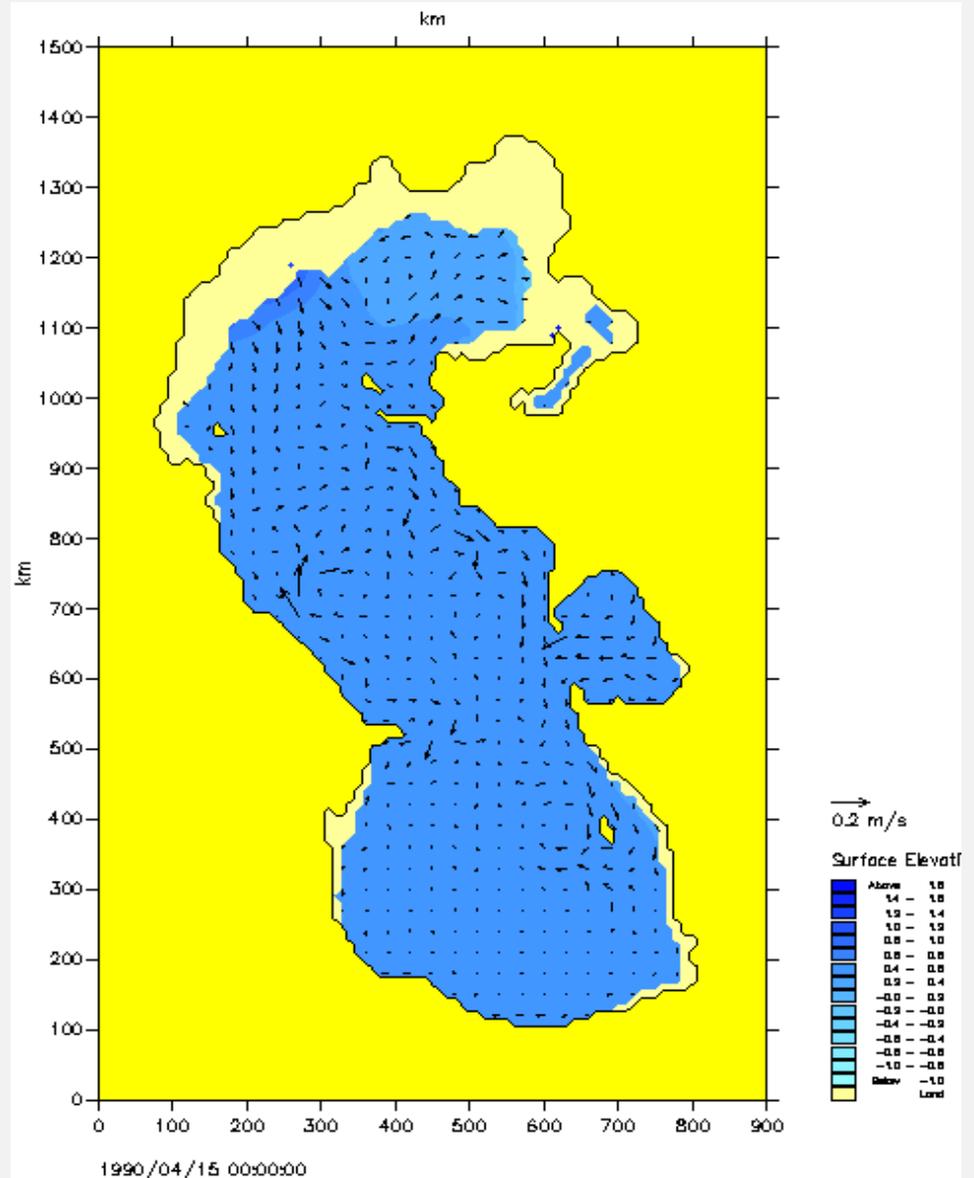
Water temperature – 2,0...23,5°C, hydrogen ion exponent – 8,3, dissolved oxygen – 9,94 mg/dm³, BOD₅ – 2,22 mg/dm³. Increase of MPC isn't revealed. In comparison with first half of the year 2017 the water quality hasn't changed.

Warming system of the storm surges on the Caspian Sea

Information of Kazakhstan's stations and posts by e-mail 2 times per day

Information of ECMWF by ftp-channel

| Advance time | PUV |
|-------------------|---|
| 0 hour (analysis) |  |
| +6 hour |  |
| +120 hour |  |



SWAN

Simulating WAVes Nearshore

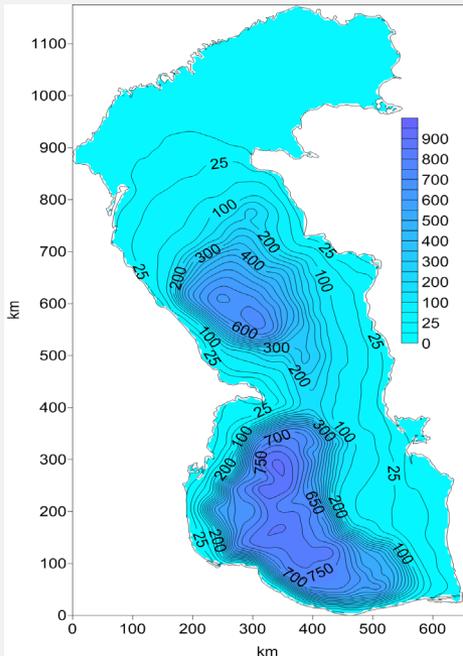
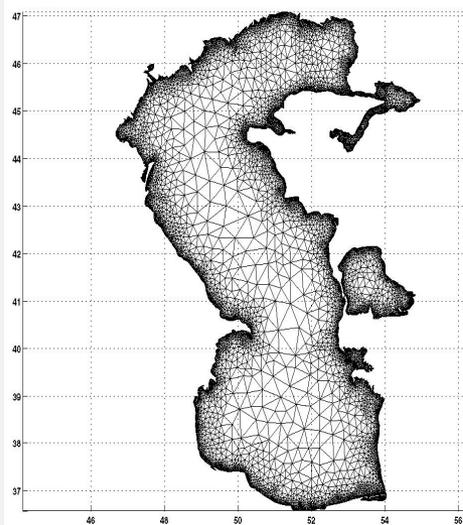
SWAN (Simulation Waves Nearshor) been developed by the Delphic Institute of technologies (Netherlands).

Input data:

- points of regular or triangularly grid;
- Caspian Sea bathymetry model;
- Wind speed and wind direction.

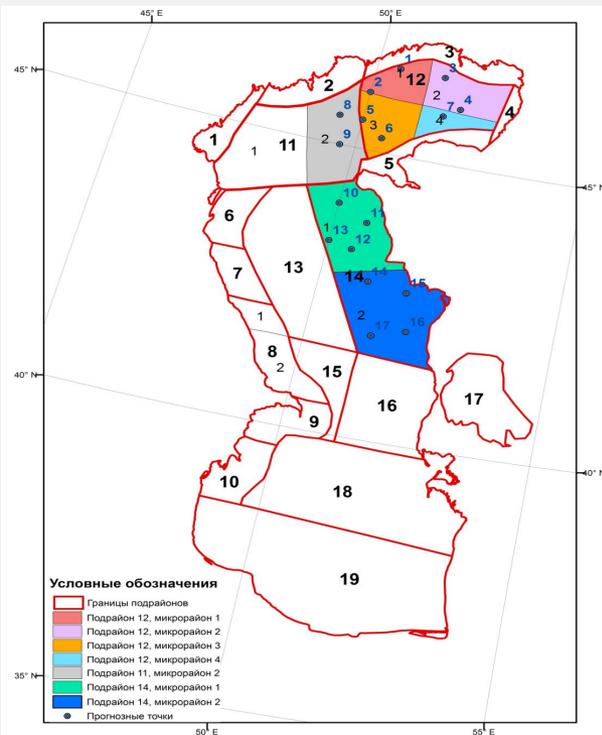
Выходные данные:

- Wave height and wave direction, wave period, Wind speed and wind direction in the selected points.

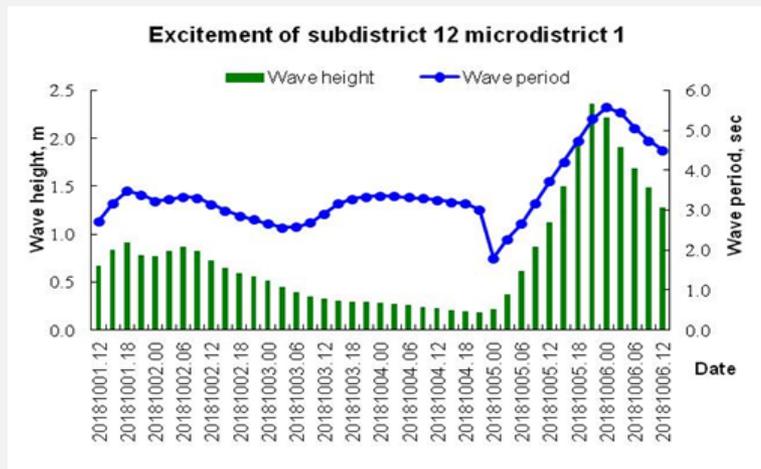
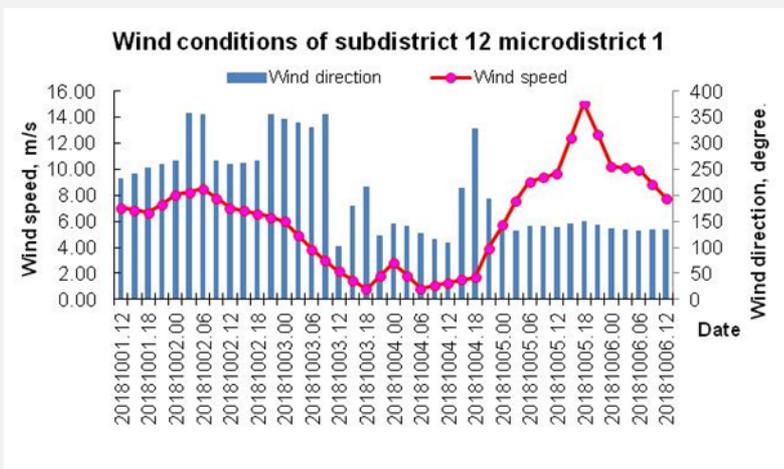
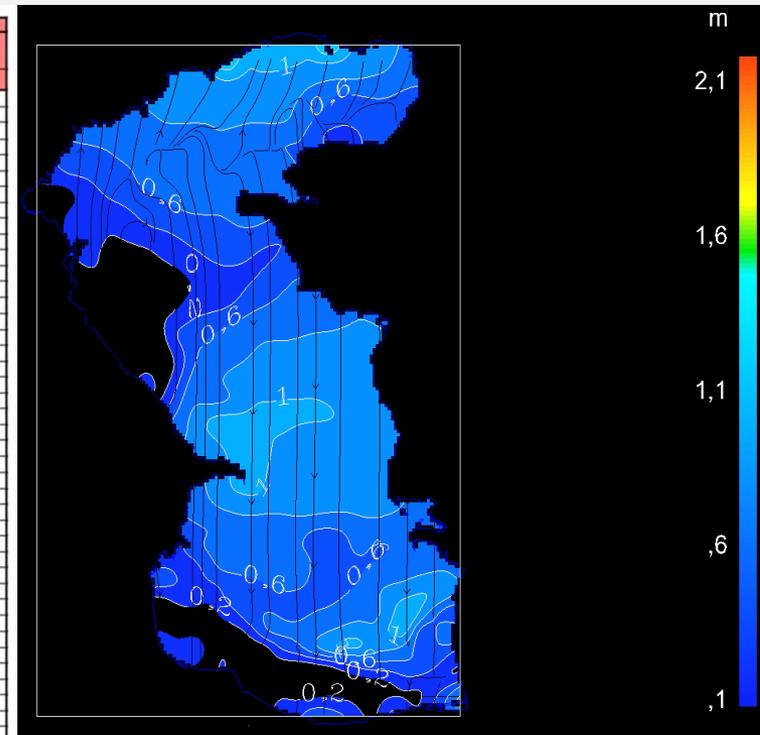


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SWAN October_2018(1-6).1\20181001.dat - Notepad++
File Edit Format View ColorScheme Settings Options Instruments Macros Run Log Plugins Window ?
20181001.dat
1 *****HEADLINE*****
2
3 PROJ ' Caspy ' 'FBI'
4
5 # Field name: Caspian Sea area
6 # Time of simulation: 01 октября 2018 12:00 - 06 октября 2018 12:00
7 #
8 *****MODEL INPUT*****
9 #
10 #SET LEVEL 0.30
11 #
12 #SET NAMESET 200
13 COORDINATES SPHERICAL
14 CURVE METHOD: 44 34 0. 9 12 36 48 60 72 84 96 108 120 132 144 156 168 180 192 204 216 228 240 252 264 276 288 300 312 324 336 348 360 372 384 396 408 420 432 444 456 468 480 492 504 516 528 540 552 564 576 588 600 612 624 636 648 660 672 684 696 708 720 732 744 756 768 780 792 804 816 828 840 852 864 876 888 900 912 924 936 948 960 972 984 996 1008 1020 1032 1044 1056 1068 1080 1092 1104 1116 1128 1140 1152 1164 1176 1188 1200 1212 1224 1236 1248 1260 1272 1284 1296 1308 1320 1332 1344 1356 1368 1380 1392 1404 1416 1428 1440 1452 1464 1476 1488 1500 1512 1524 1536 1548 1560 1572 1584 1596 1608 1620 1632 1644 1656 1668 1680 1692 1704 1716 1728 1740 1752 1764 1776 1788 1800 1812 1824 1836 1848 1860 1872 1884 1896 1908 1920 1932 1944 1956 1968 1980 1992 2004 2016 2028 2040 2052 2064 2076 2088 2100 2112 2124 2136 2148 2160 2172 2184 2196 2208 2220 2232 2244 2256 2268 2280 2292 2304 2316 2328 2340 2352 2364 2376 2388 2400 2412 2424 2436 2448 2460 2472 2484 2496 2508 2520 2532 2544 2556 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4968 4980 4992 5004 5016 5028 5040 5052 5064 5076 5088 5100 5112 5124 5136 5148 5160 5172 5184 5196 5208 5220 5232 5244 5256 5268 5280 5292 5304 5316 5328 5340 5352 5364 5376 5388 5400 5412 5424 5436 5448 5460 5472 5484 5496 5508 5520 5532 5544 5556 5568 5580 5592 5604 5616 5628 5640 5652 5664 5676 5688 5700 5712 5724 5736 5748 5760 5772 5784 5796 5808 5820 5832 5844 5856 5868 5880 5892 5904 5916 5928 5940 5952 5964 5976 5988 6000 6012 6024 6036 6048 6060 6072 6084 6096 6108 6120 6132 6144 6156 6168 6180 6192 6204 6216 6228 6240 6252 6264 6276 6288 6300 6312 6324 6336 6348 6360 6372 6384 6396 6408 6420 6432 6444 6456 6468 6480 6492 6504 6516 6528 6540 6552 6564 6576 6588 6600 6612 6624 6636 6648 6660 6672 6684 6696 6708 6720 6732 6744 6756 6768 6780 6792 6804 6816 6828 6840 6852 6864 6876 6888 6900 6912 6924 6936 6948 6960 6972 6984 6996 7008 7020 7032 7044 7056 7068 7080 7092 7104 7116 7128 7140 7152 7164 7176 7188 7200 7212 7224 7236 7248 7260 7272 7284 7296 7308 7320 7332 7344 7356 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Scheme of the forecast with SWAN model



| Date / time | subdistrict 12, microdistrict 1 | | | | |
|-------------|---------------------------------|-------------------------|--------------------|-------------------|-------------------------|
| | Wave height m | Wave direction rumba | Wave period sec | Wind speed m/s | Wind direction rumba |
| 20181001.12 | 0.67 | Ю3 | 2.7 | 7.08 | Ю3 |
| 20181001.15 | 0.83 | Ю3 | 3.2 | 6.88 | Ю3 |
| 20181001.18 | 0.91 | Ю3 | 3.5 | 6.68 | з |
| 20181001.21 | 0.78 | Ю3 | 3.4 | 7.36 | з |
| 20181002.00 | 0.77 | Ю | 3.2 | 8.04 | з |
| 20181002.03 | 0.82 | Ю | 3.3 | 8.26 | с |
| 20181002.06 | 0.87 | Ю | 3.3 | 8.49 | с |
| 20181002.09 | 0.83 | Ю | 3.3 | 7.76 | з |
| 20181002.12 | 0.73 | Ю | 3.1 | 7.03 | з |
| 20181002.15 | 0.65 | Ю | 3.0 | 6.82 | з |
| 20181002.18 | 0.60 | Ю | 2.9 | 6.61 | з |
| 20181002.21 | 0.56 | Ю | 2.8 | 6.31 | с |
| 20181003.00 | 0.51 | Ю | 2.7 | 6.01 | с |
| 20181003.03 | 0.45 | Ю | 2.6 | 4.92 | с |
| 20181003.06 | 0.39 | ЮВ | 2.6 | 3.83 | СЗ |
| 20181003.09 | 0.35 | ЮВ | 2.7 | 3.00 | с |
| 20181003.12 | 0.33 | ЮВ | 2.9 | 2.17 | с |
| 20181003.15 | 0.31 | ЮВ | 3.2 | 1.48 | Ю |
| 20181003.18 | 0.30 | ЮВ | 3.3 | 0.80 | Ю3 |
| 20181003.21 | 0.29 | ЮВ | 3.3 | 1.81 | ЮВ |
| 20181004.00 | 0.28 | ЮВ | 3.4 | 2.82 | ЮВ |
| 20181004.03 | 0.27 | В | 3.4 | 1.82 | ЮВ |
| 20181004.06 | 0.26 | ЮВ | 3.7 | 0.82 | ЮВ |
| 20181004.09 | 0.24 | ЮВ | 3.3 | 1.07 | ЮВ |
| 20181004.12 | 0.23 | ЮВ | 3.3 | 1.32 | В |
| 20181004.15 | 0.21 | ЮВ | 3.2 | 1.52 | Ю3 |
| 20181004.18 | 0.20 | ЮВ | 3.2 | 1.72 | СЗ |
| 20181004.21 | 0.18 | ЮВ | 3.0 | 3.92 | Ю |
| 20181005.00 | 0.21 | С | 1.8 | 5.72 | ЮВ |
| 20181005.03 | 0.37 | С | 2.3 | 7.59 | ЮВ |
| 20181005.06 | 0.61 | СЗ | 2.7 | 9.07 | ЮВ |
| 20181005.09 | 0.87 | СЗ | 3.2 | 9.37 | ЮВ |
| 20181005.12 | 1.13 | СЗ | 3.7 | 9.68 | ЮВ |
| 20181005.15 | 1.50 | СЗ | 4.2 | 12.40 | ЮВ |
| 20181005.18 | 1.99 | СЗ | 4.7 | 15.12 | ЮВ |
| 20181005.21 | 2.38 | СЗ | 5.3 | 12.87 | ЮВ |
| 20181006.00 | 2.22 | СЗ | 5.6 | 10.22 | ЮВ |
| 20181006.03 | 1.91 | СЗ | 5.4 | 10.11 | ЮВ |
| 20181006.06 | 1.69 | СЗ | 5.1 | 10.00 | ЮВ |
| 20181006.09 | 1.49 | СЗ | 4.7 | 8.89 | ЮВ |
| 20181006.12 | 1.27 | СЗ | 4.5 | 7.78 | ЮВ |



Ice Monitoring

Analysis of satellite images (satellites NOAA, MODIS Terra, MODIS Aqua ...).



The analysis of instrumental observations of water temperature, ice thickness and height of snow on ice.

Visual control of ice formation and ice sheets, types and forms of ice.



МИНИСТЕРСТВО ЭНЕРГЕТИКИ РЕСПУБЛИКИ
КАЗАХСТАН
РГП «КАЗГИДРОМЕТ»

НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ ЦЕНТР

ОБЗОР ЛЕДОВОЙ ОБСТАНОВКИ В РАЙОНЕ СЕВЕРНОГО КАСПИЯ
ЗА 23 января 2018г.



Космический снимок Каспийского моря, 17 января 2018 г.
«MODIS Rapid Response Project at NASA/GSFC»

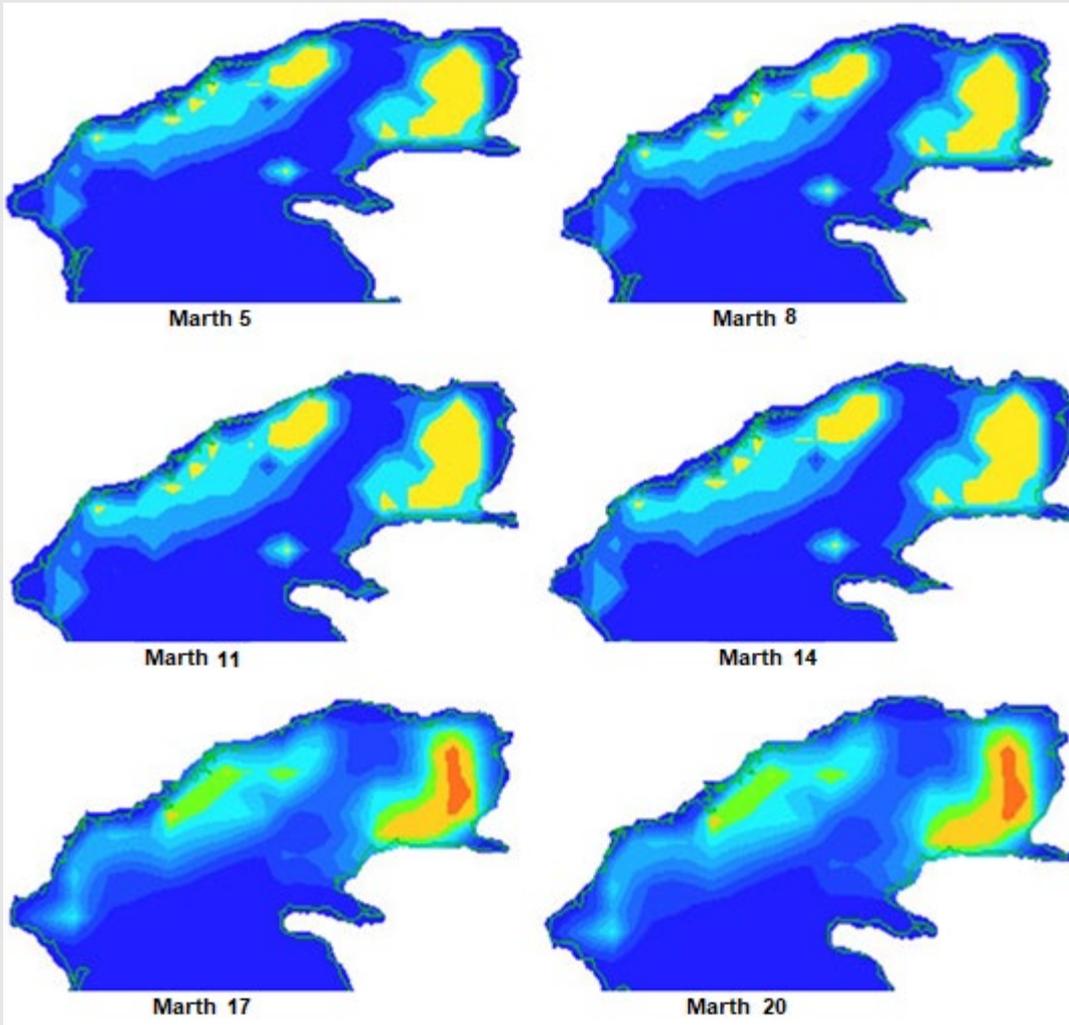
Таблица – Основные элементы ледового режима Каспийского моря на 23.01.2018 г. по оперативным данным морских станций и постов

| Пункт | Ширина припая, км | Толщина льда, см | Высота снега на льду, см | Количество неподвижного льда, баллы | Количество чистой воды, баллы | Дрейф льда, баллы | Сплочённость льда, баллы |
|---|-------------------|------------------|--------------------------|-------------------------------------|-------------------------------|-------------------|--------------------------|
| Морские станции и посты Казгидромета | | | | | | | |
| МГП Жанбай | >0,1 | 34 | | 10 | 0 | 9 | нб |
| М Пешной | 0,5-1,0 | 10 | | 10 | | 9 | нб |
| МГП Лагань | >0,1 | 9 | | 10 | 0 | 11 | 10 |
| МГП Иголкинская Банка | >0,1 | 12 | | 10 | | | |

нс – сведений нет
нб – явление не наблюдалось

Составила вед инженер УГМИКМ Васенина Е.И.
Управление гидрометеорологических исследований Каспийского моря, РГП «Казгидромет»:
Тел. (727) 2 55 84 06; E-mail: caspian_almaty@mail.ru & kaspy@meteo.kz

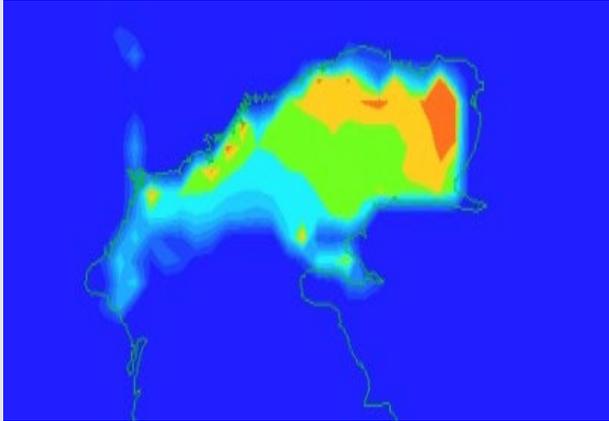
Forecasting of an Ice Conditions with Global Forecasting System



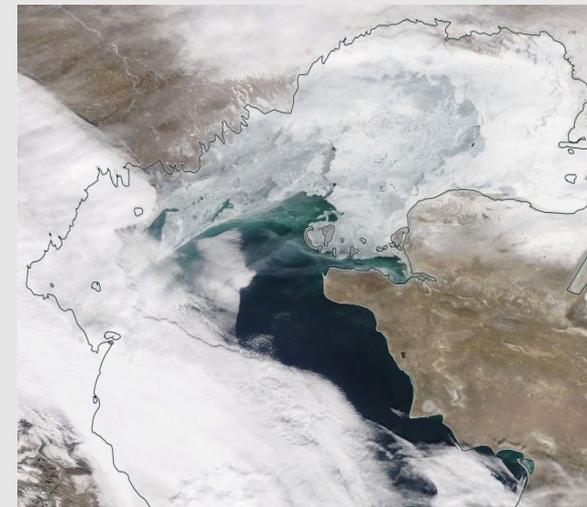
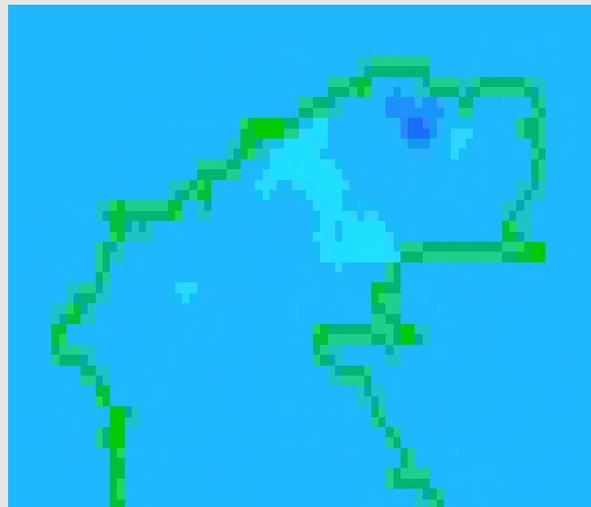
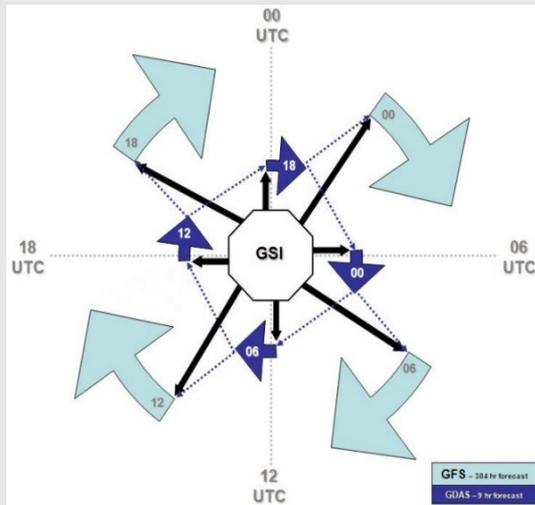
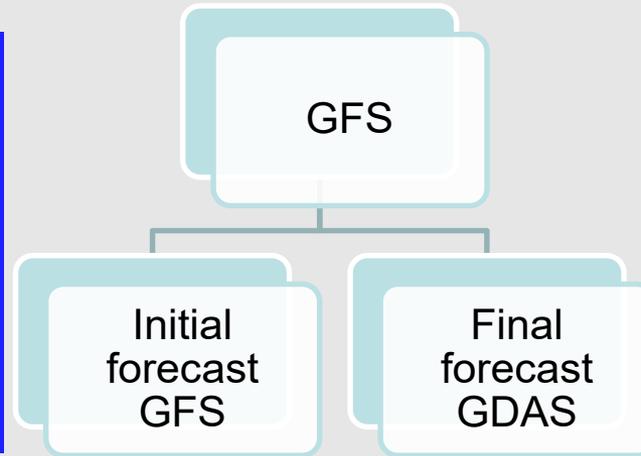
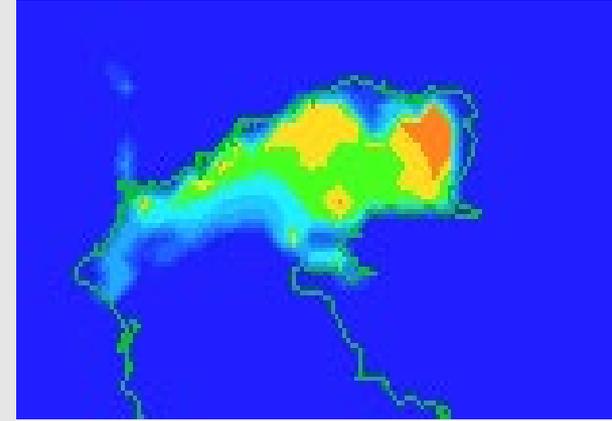
Global Forecasting System (GFS) is the weather numerical forecasting system containing global computer model and the variation analysis made by National Weather Service of the USA (NWS).

Mathematical model is started four times per day and gives forecasts for 16 days ahead with reduction of spatial resolution in 10 days.

The forecast for March 17, 2018 (GFS)



Check the forecast for March 17, 2018 (GDAS)



Difference between GFS and GDAS



- Sitemap
- Feedback

Caspian Sea

Добавлено: 19 Май 2017 11:22, Изменено: 23 Май 2017 18:03



The **Caspian Sea** is the largest closed sea in the world, located on the continent of Eurasia. The coastline is 2,220 km in Kazakhstan. The region of the Caspian Sea adjacent to Kazakhstan, according to natural conditions, is divided into two parts: the eastern part of the Northern Caspian and the Middle Caspian. The eastern part of the Caspian is shallow with a low coast and a flat bottom. Here the average depth is 2 m, and the depth, in the region of the Ural Furrow, is 8 m. The bottom of the Caspian is complicated by the presence of furrows. It is a semi-enclosed reservoir, a bay which is formed in the conditions of the collision of the Ural and the Volga.

Foto by Akim Mengu

It is practically isolated from the direct influence of the waters of the Middle Caspian. The eastern part of the Caspian is shallow with a low coast and a flat bottom. The average depth is 200 m, and the maximum depth is up to 700 m. The Caspian Sea and its catchment area is of great importance for the economies of the Caspian region of Kazakhstan. This unique reservoir with a diverse flora and fauna and hydrocarbon reserves. Socio-economic activities in the coastal zone has a significant impact on the hydrometeorological regime. The level of the Caspian Sea fluctuates during the year

The Caspian Sea hydrometeorological research Department

- Caspian sea water surface status review
- Caspian sea hydrometeorological research
- Caspian sea ecological research

Forecast* of the Caspian Sea water level for 27 September – 02 October 2018

In the northern part of the Caspian Sea the sea level fluctuation from storm surges is expected about minus 27,94 m with the maximal increase up to minus 27,39 m and its minimal downturn up to minus 28,24 m.

In the middle part of the Caspian Sea the sea level fluctuation is expected about minus 28,08 m with rise up to minus 27,81 m and recession up to minus 28,56 m.

* Calculations are received at use of the hydrodynamic module MIKE 21 of the Danish Hydraulic Institutes adapted to conditions of the Caspian Sea in the RSE "Kazhydromet". At account the water level observational data and numerical forecast of the baric field were used (probability 24-120 h).

Caspian Sea Water Surface, 20-26 September 2018

In the Caspian Sea Northern Part the mean sea level corresponded to mark minus 27,95 m, maximal – minus 27,81 m, minimal – minus 28,12 m (using observational data from the Kazakhstan's sea stations and posts: Peshnoy, Zhanbay, Kulaly Island and Roshydromet's sea station – Tuyleny Island).

In the Caspian Sea Middle Part the mean sea level corresponded to mark minus 28,08 m, maximal – minus 27,84 m, minimal – minus 28,50 m (using observational data from the Kazakhstan's sea stations and posts: Fort-Shevchenko, Aktau, Fetisovo and Roshydromet's sea station - Makhachkala).



Caspian sea ecological research



"Hydrometeorology and Ecology" scientific and technical magazine

Astana

Weather forecast information is not available at this moment.

World Weather Information Service



**A lot of thanks
for attention!**