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# **I.R.IRAN NATIONAL REPORT for 27<sup>th</sup> session of Coordination committee of Hydrometeorology of Caspian sea (CASPCOM)**

**Khazaghestan, November 22, 2023**



سازمان حفاظت محیط زیست



وزارت نیرو

موسسه تحقیقات آب

مرکز ملی مطالعات و تحقیقات دریای خزر



سازمان نقشه برداری کشور



سازمان بنادر و دریانوردی



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In this report  
we talk about

Development of measuring network in southern  
coasts of Caspian Sea

Caspian Sea National Day

Climate report of Caspian South Coastal 2020-2021

Caspian Sea level fluctuations 2020-2021



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## Marine Prediction

### 4-1- Marine “TAHAK” (Development of Applied Meteorology)

In this report  
we talk about

The effects of decrease water level of the Caspian Sea and the  
coasts of Iran



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## Marine meteorological stations

### Mazandaran

Two meteorological stations are being built in Izadshahr Noor and Tonkabon near the sea and with direct access to the sea. These two stations are equipped with fully automatic stations and all communication lines.

1. Development of measurement network in southwestern coast of Caspian Sea



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Synoptic Station for the Caspian Coast





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Coastal and marine meteorological monitoring network of  
Mazandaran province



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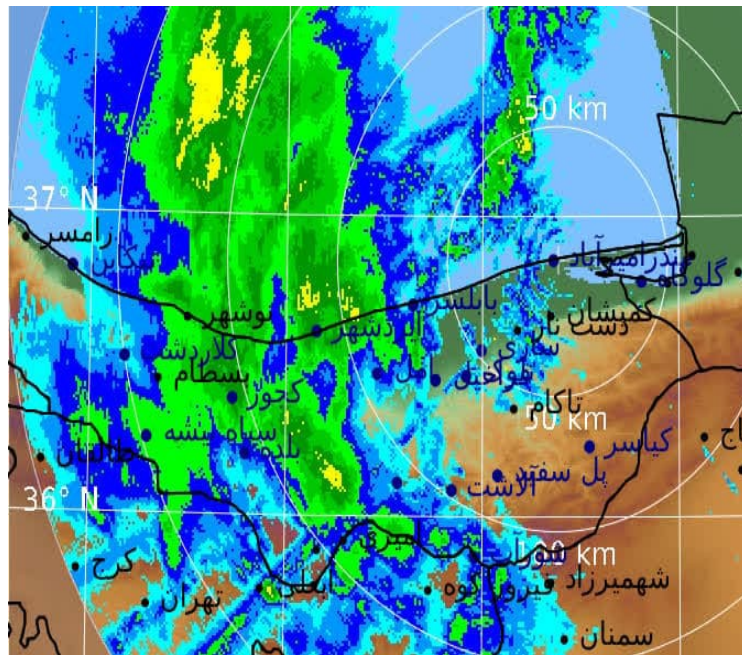
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- Amirabad port radar
- C-band weather radar that provides various products.



- Nowshahr Bouye
- Specifications and location of Nowshahr Bouye, you can see a view of Nowshahr port. The specifications related to the establishment of this Bouye are given . This buoy is currently inactive.



**A view of the Oceanor-type buoy of Nowshahr port**





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## Gilan

Monitoring of weather conditions on the southwestern shores of the Caspian Sea is done using the information obtained from 6 satellite stations located in the coastal province of Gilan. Investigations of long-term climatic fluctuations in this region are carried out using stations that are more than 30 years old and include Bandar Anzali and Rasht stations. The development and automation program of this monitoring network is underway in the coming years, and in this regard, two anemometer stations have been purchased for Astara and Lisar regions, which are in the setting up phase. The comprehensive plan for the development of coastal and marine stations in Gilan province can be shown in the figure.



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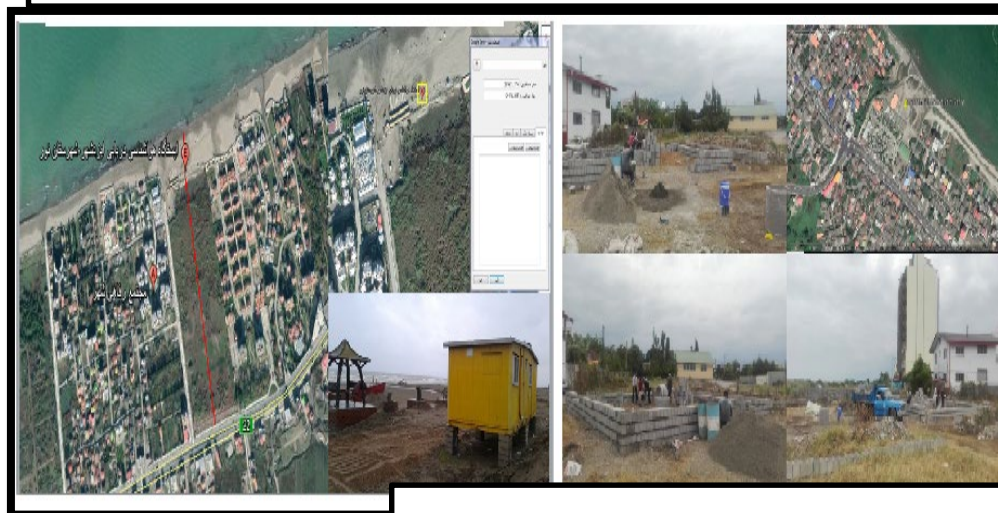
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Development of marine meteorology observation, Noor and Tonkabon,  
Mazandaran Province



**Meteorological Radar**

Kiyashahr Meteorological Radar



**Amir Abad Meteorological Radar**

**Development of  
measurement  
network in  
southern coasts of  
Caspian Sea**

- Anzali - Nowshahr - Amirabad - Astara - Gorgan Bay

- **Tide gauge**  
stations on  
the southern  
shores of the  
Caspian Sea







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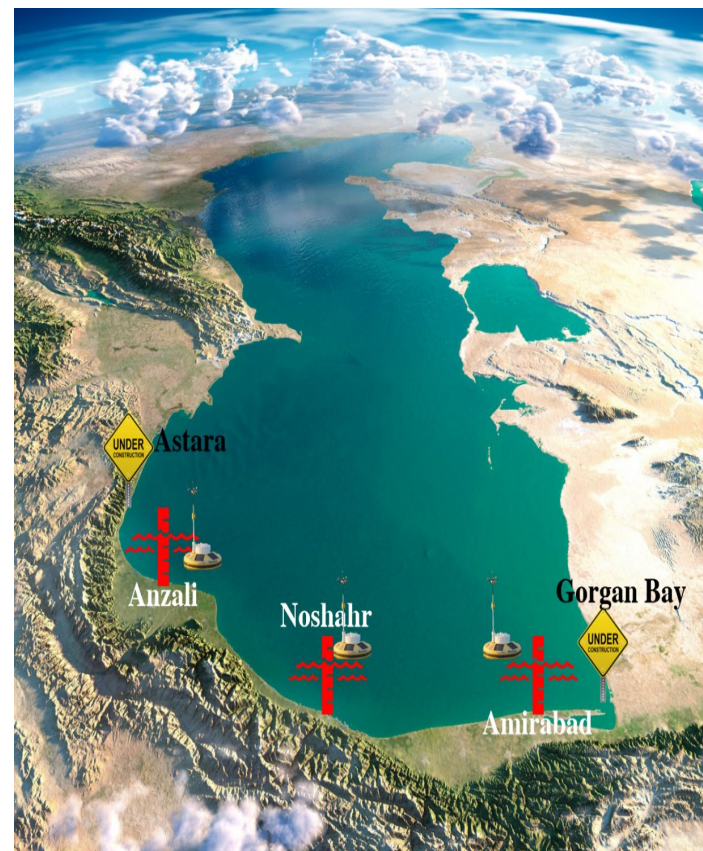
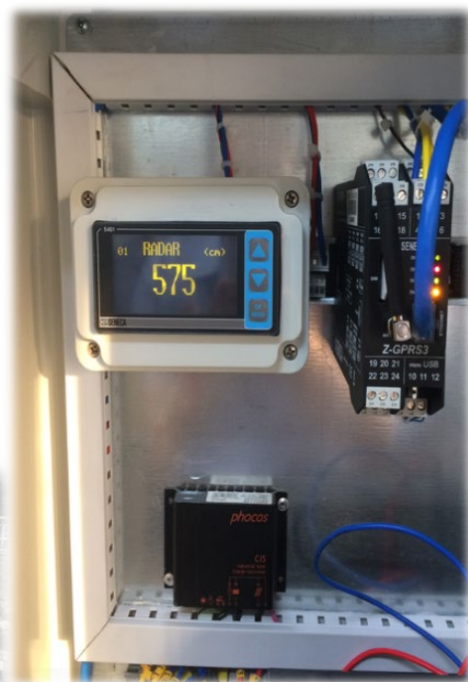
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Anzali – 1951  
Nowshahr 2012  
AmirAbad 2012  
Astara 2020  
Gorgan Bay 2018-2022





- Installing 30 benchmarks on the southern shores of the Caspian Sea and connecting to the country's level measurement network





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- Reducing the water level of the Caspian Sea based on the level measurement stations in the ports



21 cm decrease from the summer of 1401 to the summer of 1402

132 cm decrease from 1392 to 1402

204 cm decrease from 1374 to 1402



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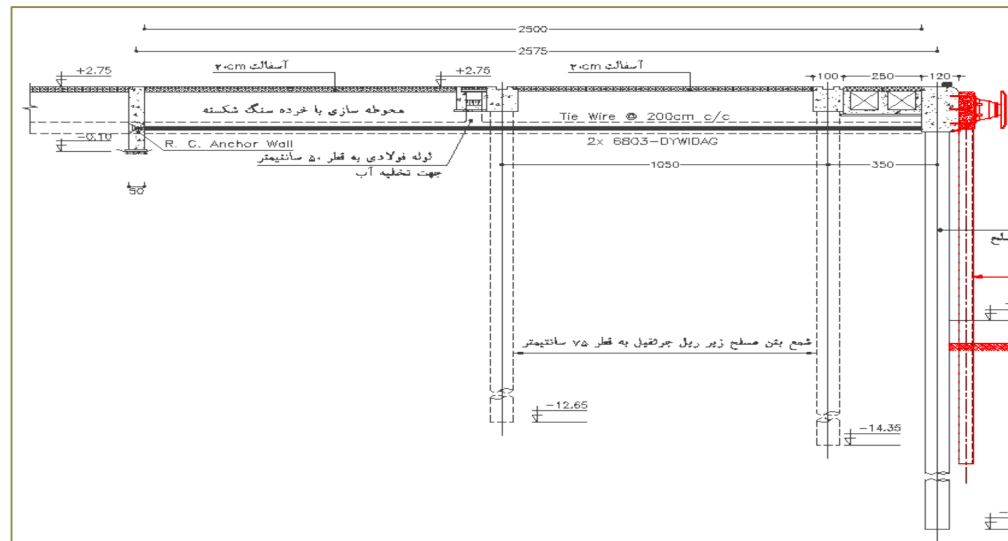
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- | Wavelength | Frequency  | 92° W  | 93° W  | 94° W  | 95° W  | 96° W  | 97° W  | 98° W  | 99° W  | 1400° W | ° W<br>1401 | ° W<br>1402 |
|------------|--|--------|--------|--------|--------|--------|--------|--------|--------|---------|-------------|-------------|
| 1605 MHz   | 1605 MHz<br>1610 MHz<br>1615 MHz<br>1620 MHz<br>1625 MHz<br>1630 MHz | -      | -      | -      | -      | -      | -      | -27.28 | -27.3  | -27.66  | -27.78      | -           |
| 1610 MHz   |  | -26.63 | -26.85 | -27.01 | -26.89 | -26.94 | -27.02 | -27.25 | -27.28 | -27.52  | -27.66      | -27.91      |
| 1615 MHz   |  | -26.56 | -26.79 | -27.03 | -26.88 | -26.79 | -26.9  | -27.17 | -27.24 | -27.62  | -27.77      | -28.03      |
| 1620 MHz   |  | -26.56 | -26.69 | -26.88 | -26.78 | -26.91 | -27.01 | -27.17 | -27.2  | -27.47  | -27.5       | -27.83      |
| 1625 MHz   |  | -      | -      | -      | -      | -      | -      | -      | -      | -27.47  | -27.6       | -27.88      |
| 1630 MHz   |  | -26.59 | -26.76 | -26.97 | -26.86 | -26.92 | -26.97 | -27.18 | -27.24 | -27.55  | -27.85      | -27.91      |

- 132 Centimeter reduction from 1392 to 1402



- **Effects of Level reduction:**
- Decrease navigation depth
- Necessity of construction dredging,
- Instability of piles and piers,
- The need for changes in mooring equipment and unloading and loading systems







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## Anzali port: checking the stability of the pier Base level- Rajaei

1412 WL=- 31.30	1410 WL=-30.70	1408 WL=- 30.10	1406 WL=-29.50	1404 WL=-28.9	1401 WL=-28	بندر انزلی
4.37	3.87	3.37	2.87	2.37	1.8	اسکله 1
2.87	2.37	1.87	1.37	0.87	0.3	اسکله 2
2.37	1.87	1.37	0.87	0.37	-0.2	اسکله 3
2.57	2.07	1.57	1.07	0.57	0	اسکله 4
2.77	2.27	1.77	1.27	0.77	0.2	اسکله 5
2.57	2.07	1.57	1.07	0.57	0	اسکله 6
1.87	1.37	0.87	0.37	-0.13	-0.7	اسکله 7
2.07	1.57	1.07	0.57	0.07	-0.5	اسکله 8
2.87	2.37	1.87	1.37	0.87	0.3	اسکله 9
2.57	2.07	1.57	1.07	0.57	0	اسکله 10
3.07	2.57	2.07	1.57	1.07	0.5	اسکله 11
1.87	1.37	0.87	0.37	-0.13	-0.7	اسکله 12
1.97	1.47	0.97	0.47	-0.03	-0.6	اسکله 13
2.92	2.42	1.92	1.42	0.92	-0.7	اسکله 14

The numbers in the table are equivalent to the required thickness of dredging to reach the desired navigation depth.



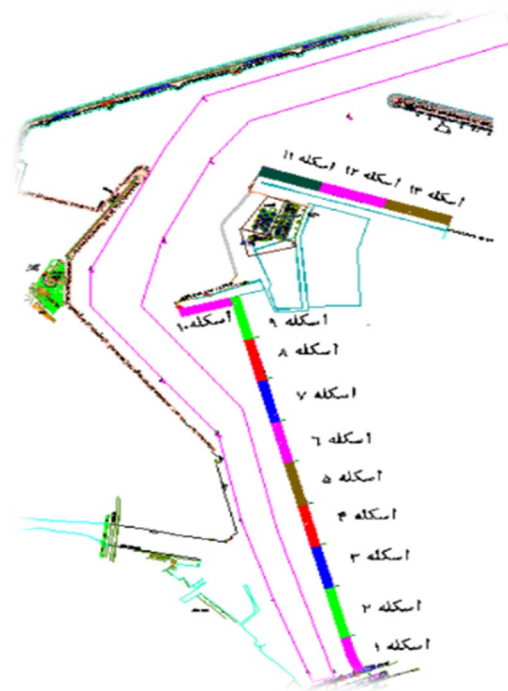
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The required dredging volume of Anzali port



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## Nowshahr Port: Investigation of the stability wharf

1408 WL=-30	1406 WL=-29.5	1404 WL=-29	1402 WL=- 28.50	1401 WL=-28	نوشهر
1.4	0.9	0.4	-0.1	-0.6	اسکله 1
1.45	0.95	0.45	-0.05	-0.55	اسکله 2
2.65	2.15	1.65	1.15	0.65	اسکله 3
2.4	1.9	1.4	0.9	0.4	اسکله 4
1.95	1.45	0.95	0.45	-0.05	اسکله 5
1.25	0.75	0.25	-0.25	-0.75	اسکله 6
1.75	1.25	0.75	0.25	-0.25	اسکله 7
1.8	1.3	0.8	0.3	-0.2	اسکله 8
2.85	2.35	1.85	1.35	0.85	اسکله 9



The thickness of dredging required to calculate the optimal depth of navigation - evaluation of the stability of wharf

- Conclusion:
- In the last 28 years, 204 cm and 132 cm in the last 10 years have been decreased. In the last year, 21 cm has decreased. Decrease in level = decrease in navigation depth, the need for construction dredging operations - the instability of wharf. In Anzali port in 1406, all wharf have lost about 30% of their performance and need repairs. In Nowshahr port, wharf in 1404, 6 to 9 have lost about 30% of their performance and are on the threshold of instability, and repairs and preparations are needed. In 1406, all wharf are on the threshold of instability and repairs must be made. In Amirabad port, wharf 2 to 9 lost about 30% of their performance in 1402 and will need necessary preparations. In 1405, all the wharf of Amirabad port are on the verge of crisis and instability of piles. The first critical level in the Anzali port wharf is equivalent to the level of -29.50 meters compared to MSL, which will happen in the year 1406 based on the prediction of a decrease in level of 30 cm per year. This level is equal to -29 for Nowshahr port and -28.50 for Amirabad port compared to the average level of MSL open waters.



- Climatic report of the southwestern shores of the Caspian 2021-2023-
- Survey of rainfall stations in Gilan province Investigations show that the total rainfall from JUN 2021 to 2023 in most stations of the province shows a decrease of about 73.05 to 296.95 mm compared to their long term. The maximum and minimum rainfall is 1536.1 and 137.2 mm respectively for Bandar Anzali and Manjil stations.



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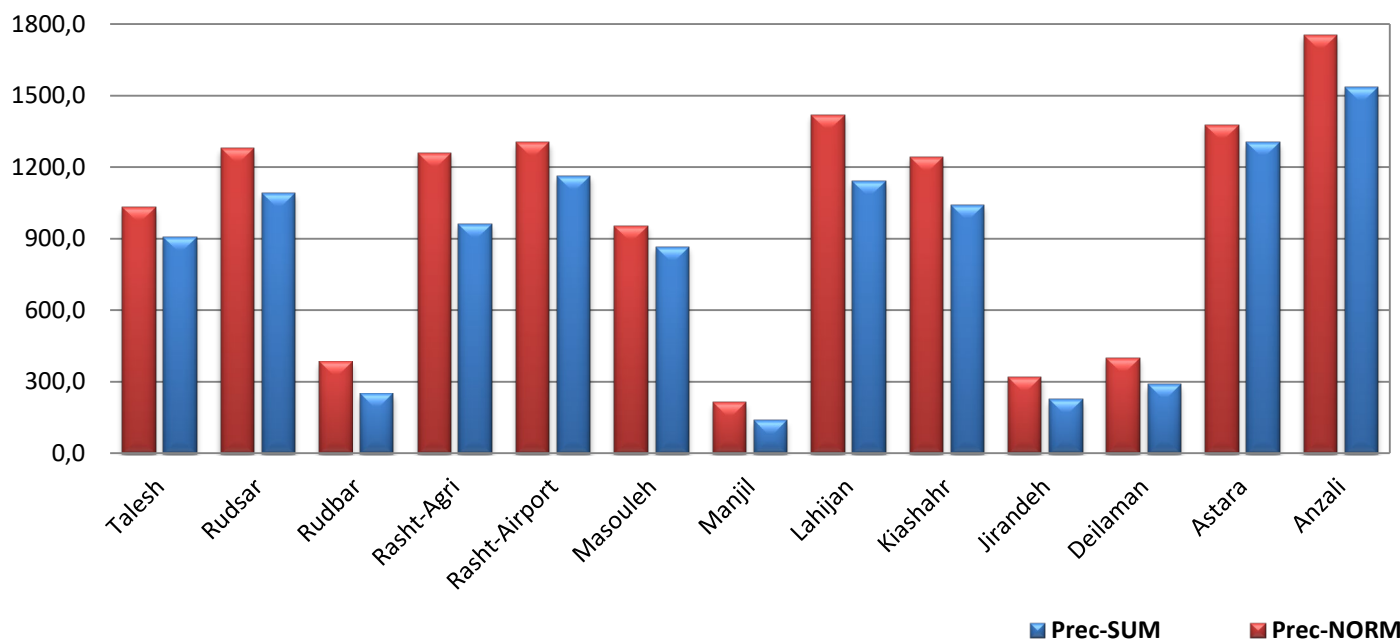
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## Precipitation



Total precipitation of the southwestern coast of the  
Caspian Sea 2021- 2023



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- Investigating the average temperature of stations in Gilan province
- According to the diagram in Figure 3, the average temperature in all stations has increased by 0-1.17 degrees Celsius compared to its long term. The highest and lowest average temperatures are 19 and 12.2 degrees Celsius respectively for Manjil and Dillman stations.



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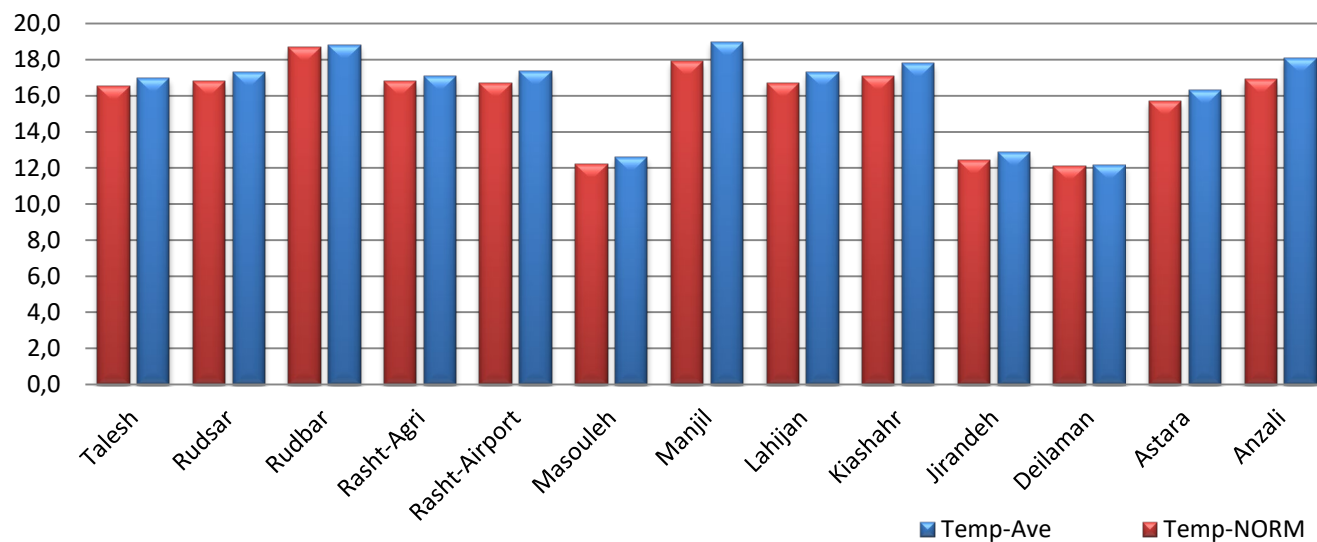
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## Temp-AVE



Average temperature on the southwestern shores of the  
Caspian Sea for the period 2021-2023





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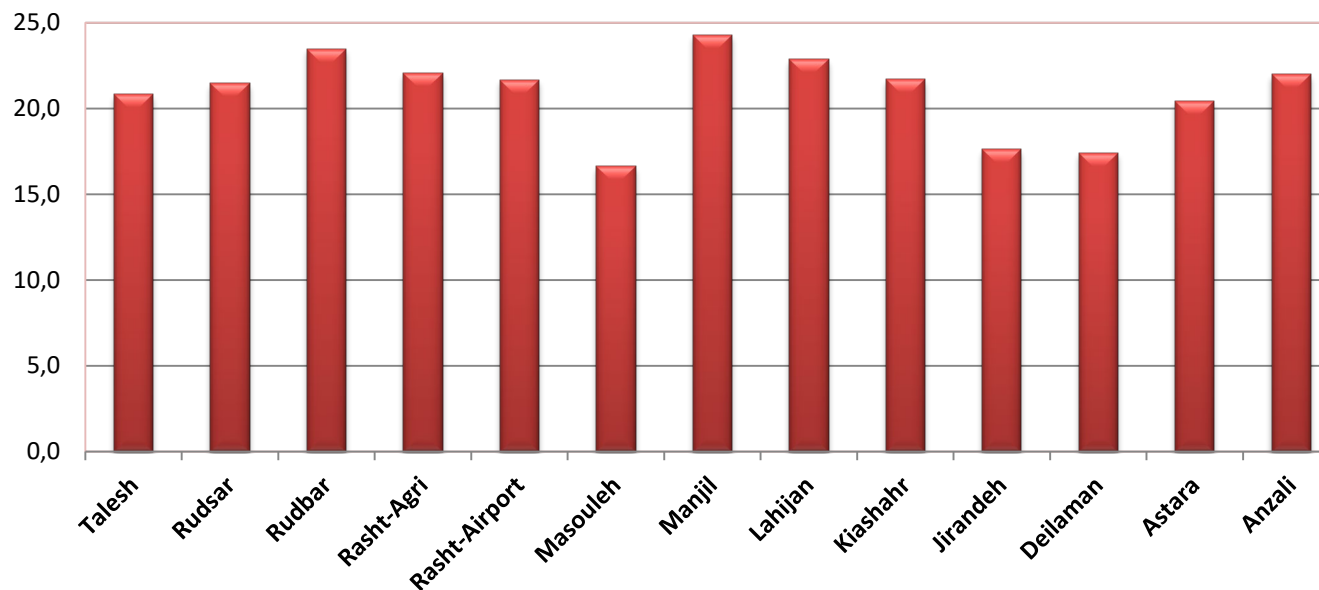
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### Temp-MAX AVE



Max temperature on the southwestern shores of the Caspian  
Sea for the period 2021-2023



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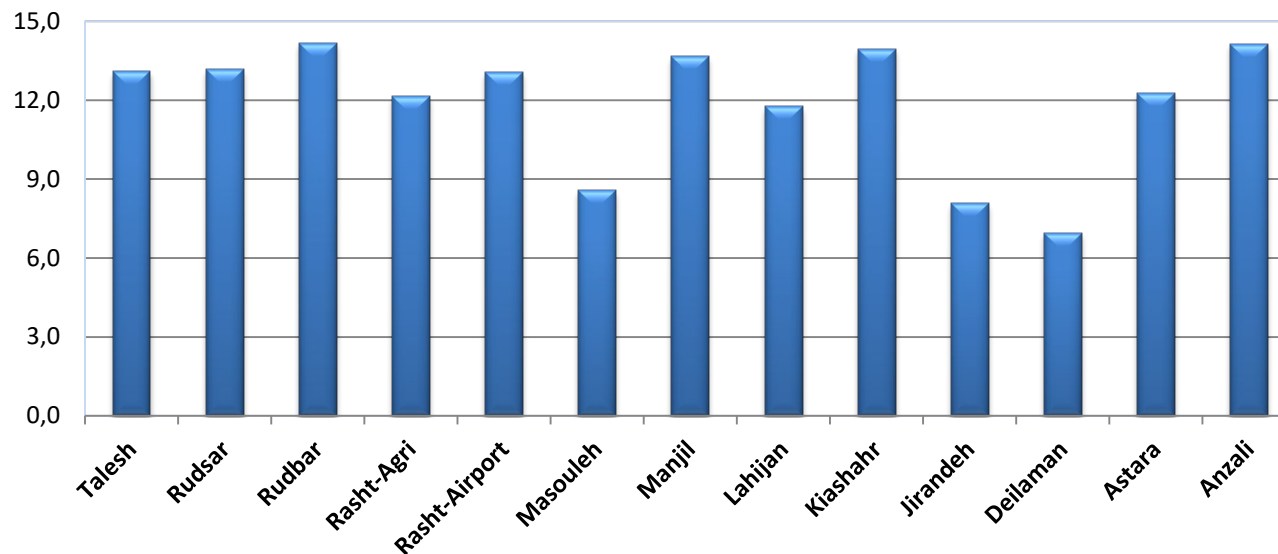
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### Temp-MIN AVE



Min temperature on the southwestern shores of the  
Caspian Sea for the period 2021-2023



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- **Report of the water year 1402-1401**
- Investigating the precipitation of stations on the southern shores of the Caspian Sea level show that the distribution of precipitation in the current water year (14021-14021) has increased significantly in most stations compared to the long term. In such a way that the stations of Bandar Anzali have had the highest rainfall this year compared to their long term, in such a way that 1751 mm of rainfall more than normal has been recorded in this station alone.



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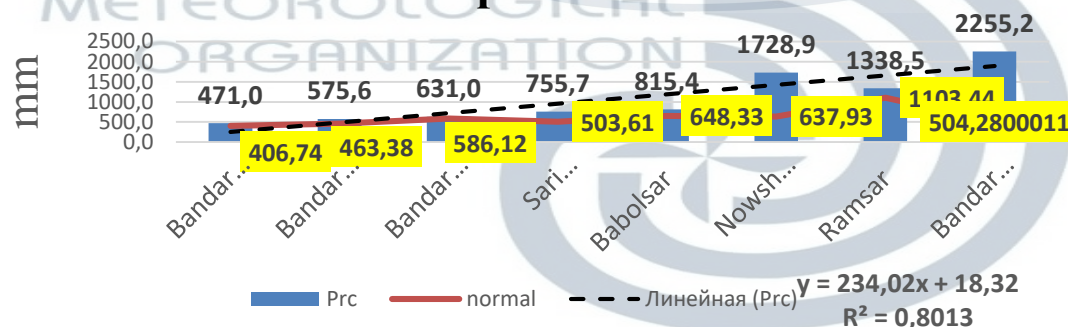
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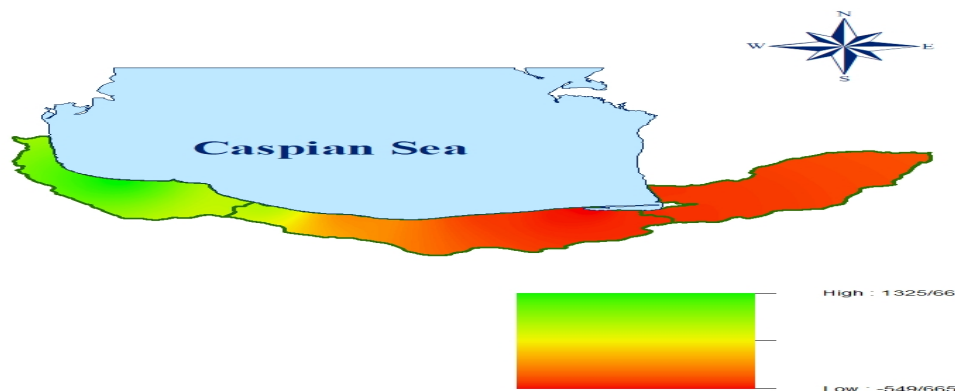
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## Graph of the Precipitation the coastal stations of the Caspian Sea in 2022-2023



## precipitation anomaly of The coasts of the Caspian Sea (2022-2023)



0 55 110 220 Kilometers



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- Investigating the humidity of stations on the southern shores of the Caspian Sea
- Investigations show that the humidity in the current water year (1402-1401) in most of the stations has a long-term trend of decreasing to some extent.





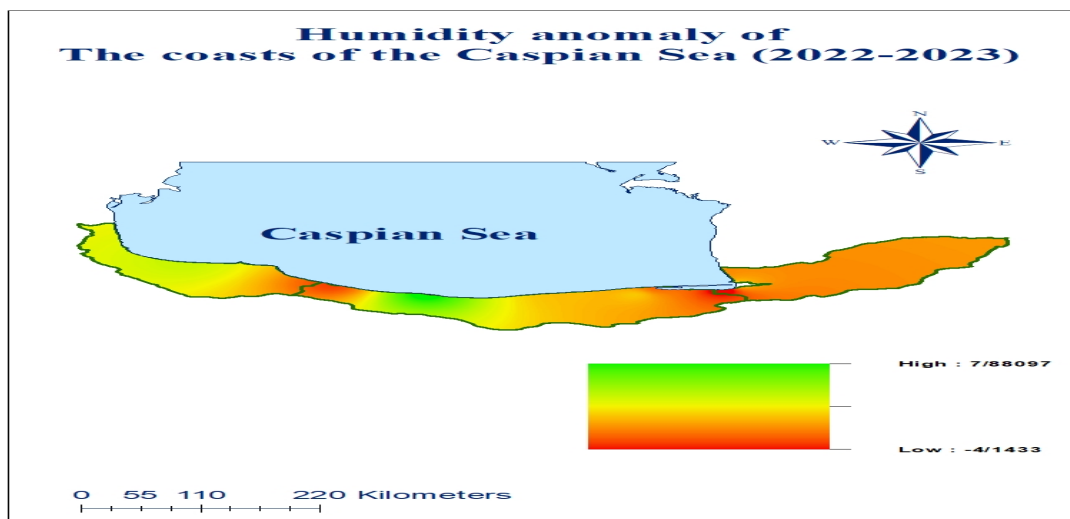
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- Evaporation survey of stations on the southern shores of the Caspian Sea
- Investigations show that evaporation in the current water year (1402-1401) in most of the stations has a long-term trend of decreasing.



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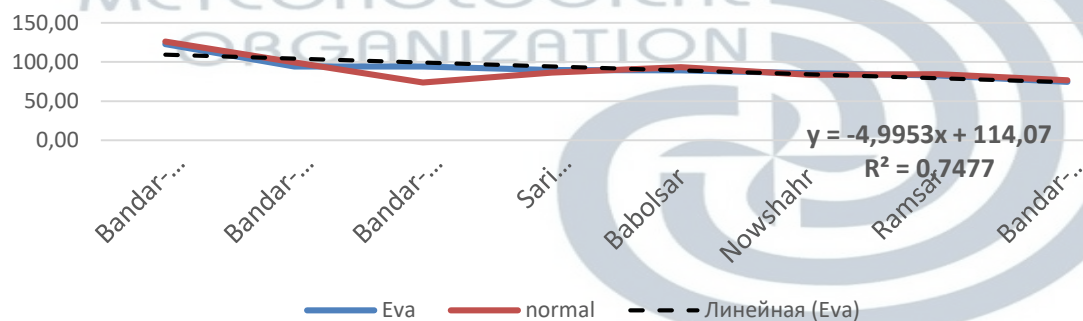
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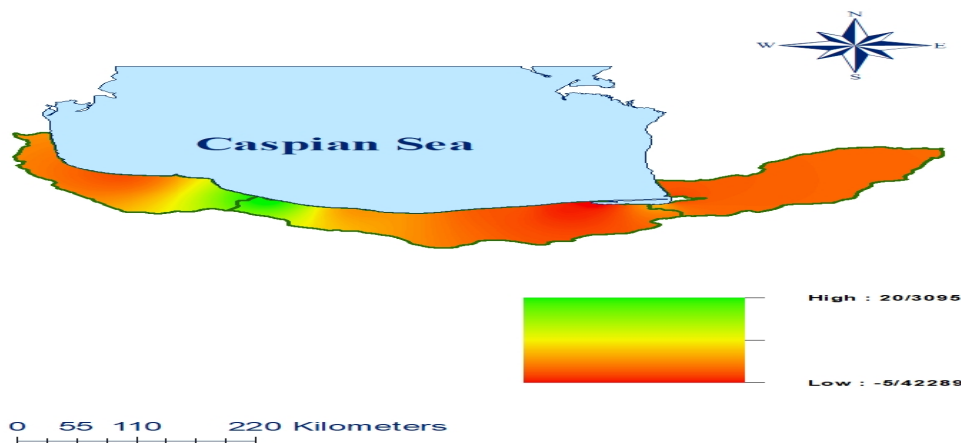
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## Graph of the Evaporation of the coastal stations of the Caspian Sea in 2022-2023



## Evaporation anomaly of The coasts of the Caspian Sea (2022-2023)



- Checking the temperature of stations on the southern shores of the Caspian Sea
- According to the average temperature graphs, the temperature in some stations of the northern coasts of the country have increased by 1.5 degrees Celsius compared to their long term. In such a way that the maximum temperature for Bandar Gaz and Bandar Turkmen stations has been recorded at 17.7 and 17.9 degrees Celsius.



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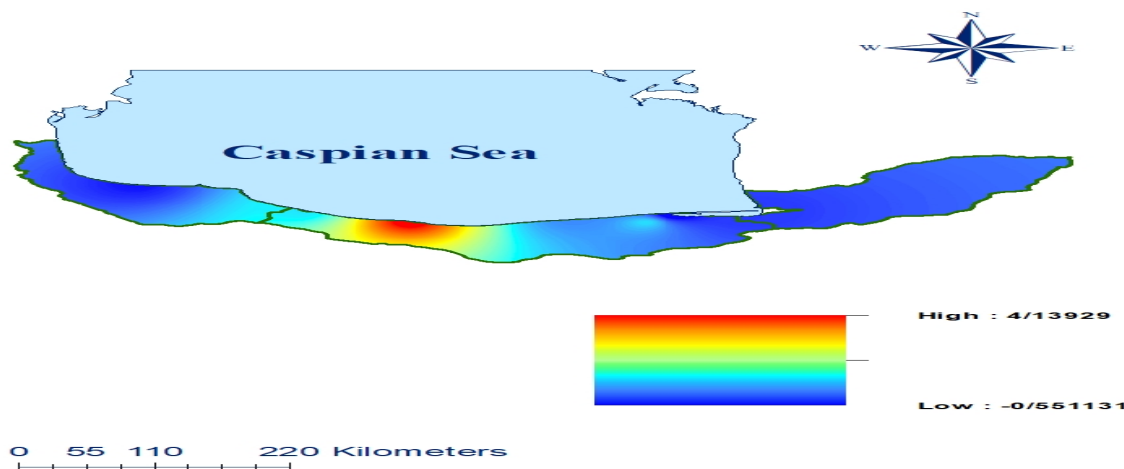
سازمان هواشناسی کشور  
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METEOROLOGICAL  
ORGANIZATION



## Graph of the average temperature of the coastal stations of the Caspian Sea in 2022-2023



## Average temperature anomaly of The coasts of the Caspian Sea (2022-2023)







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- Investigating the maximum temperature of stations on the southern shores of the Caspian Sea
- According to the maximum temperature chart, the maximum temperature for Bandar Gaz and Bandar Turkmen stations is about 22.4 and 22.2 centigrade. During the statistical year under review, the maximum temperature trend has decreased by 1.5 degrees Celsius according to normal.



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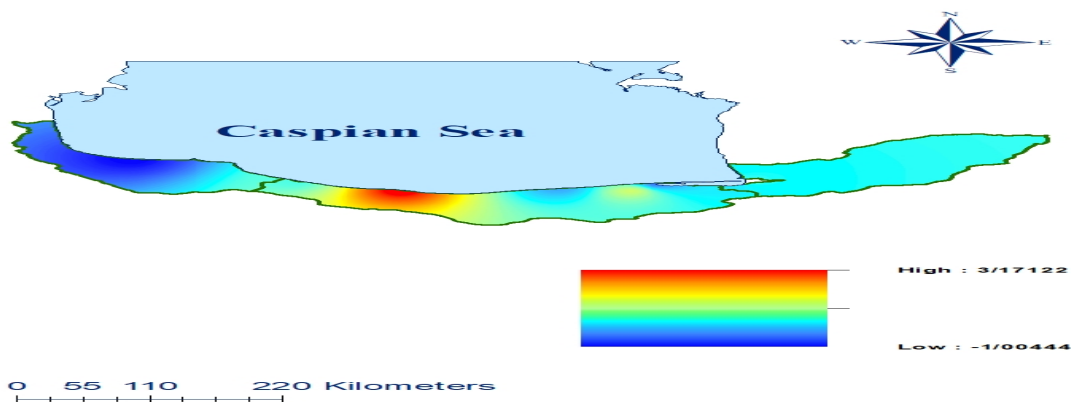
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## Graph of the Maximum temperature of the coastal stations of the Caspian Sea in 2022-2023



## Maximum temperature anomaly of The coasts of the Caspian Sea (2022-2023)



- Investigating the minimum temperature of stations on the southern shores of the Caspian Sea
- According to the minimum temperature chart, the minimum temperature for Sari and Bandar Amirabad stations is around 14.2 and 15.2 centigrade. During the analyzed statistical year, the maximum temperature trend has increased by 2.5 degrees Celsius according to normal.



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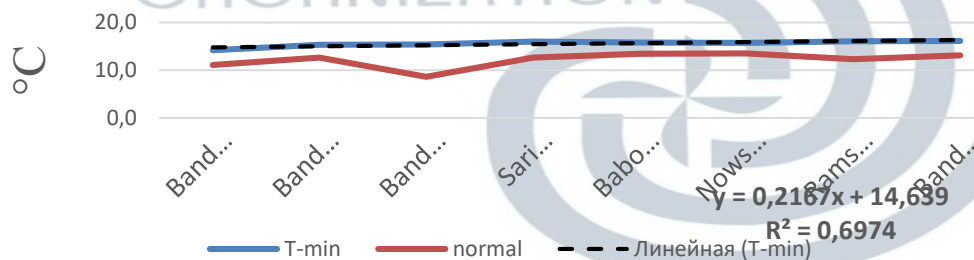
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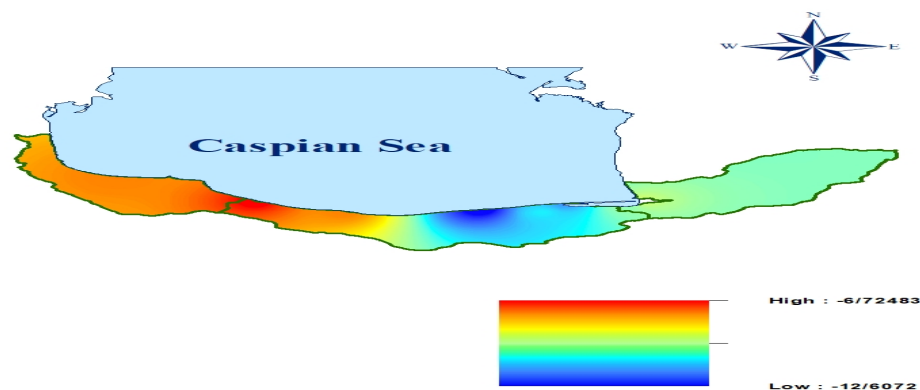
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## Graph of the Minimum temperature of the coastal stations of the Caspian Sea in 2022-2023



## Minimum temperature anomaly of The coasts of the Caspian Sea (2022-2023)



0 55 110 220 Kilometers

- Report on Caspian Sea National Day
- On the eve of the Caspian Sea National Day, the meeting of the National Marine Inanimate Resources Committee was held with the presence of representatives of the member organizations at the place of the Country Mapping Organization. The country and representatives of various organizations and bodies were held at the place of the country's mapping organization.





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- **Marine forecast**

- Marine weather warnings and warnings of different levels for the country's marine areas
- Marine weather recommendations for fishing, tourism, ports and shipping groups
- Sending daily text messages containing two-day forecasts of the weather, wind direction, speed, and wave height in the desired area of the users.



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I.R. of IRAN Met. Org. (IRIMO)

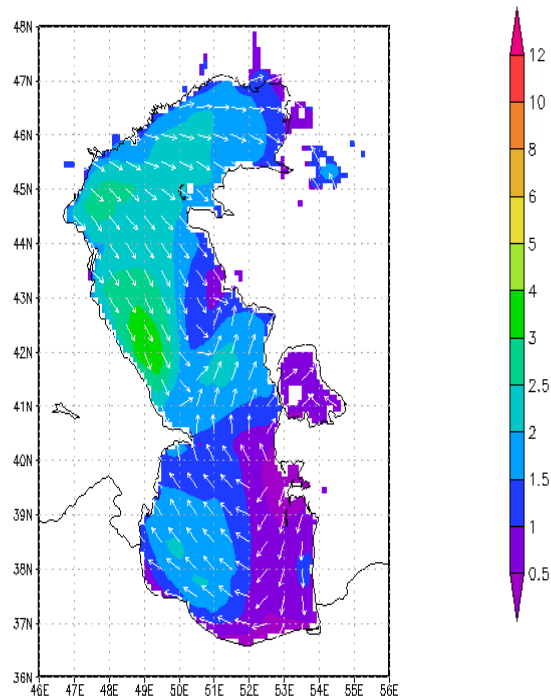
SWAN output on Caspian Sea

Significant Wave Hight (ft) & Wave Direction

TEHRAN FORECASTING CENTER

Valid Time : 00Z24SEP2022

FCST : +009 HR



I.R. of IRAN Met. Org. (IRIMO)

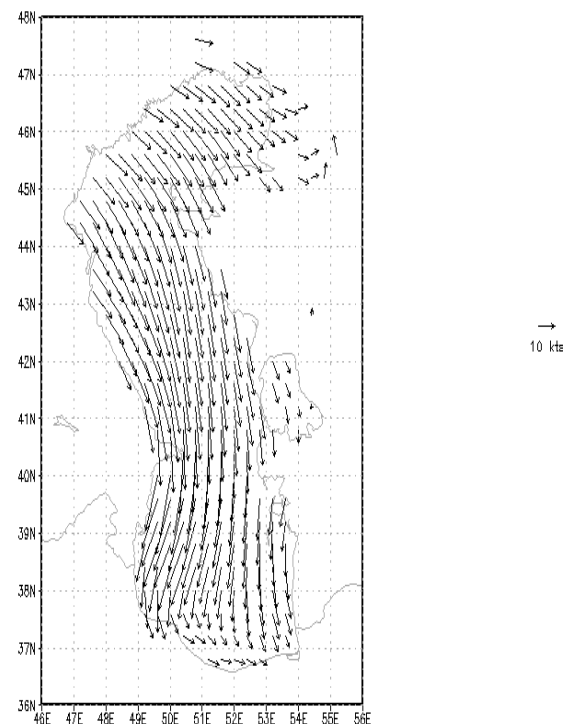
SWAN output on Caspian Sea

Wind 10m (kts)

TEHRAN FORECASTING CENTER

Valid Time : 00Z24SEP2022

FCST : +009 HR



- 12 hour forecast areas far from the coast will be issued at 08:00 and 20:00 local time, 12-hour forecast for areas near the coast
- The five-day marine forecast is also provincial for Sunday to Tuesday and Wednesday to Saturday, including the forecast of horizontal visibility (km), weather conditions, wind direction and speed (knot), wave height (ft), temperature.



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- The water is °C and a sea bream recommendation is issued for fishing in coastal provinces

 مرکز علوم جوی و اقیانوسی Oceanic & Atmospheric Science Center	<b>Marine Weather Bulletin</b>  Golestan	 سازمان هواشناسی کشور I. R. OF IRAN METEOROLOGICAL ORGANIZATION
<b>12-Hours Marine Forecast From Wed 11-08-2023, 08 To Wed 11-08-2023, 20</b>		
<b>SYNOPSIS:</b>		
<b>Ashooradeh, Miyan Ghaleh, Fredpack</b>		
	<b>NEARSHORE</b>	<b>OFFSHORE</b>
<b>Visibility</b>	medium	medium
<b>Condition</b>	Partly cloudy to cloudy, with rain, relatively strong wind and fog	Partly cloudy to cloudy, with rain, relatively strong wind and fog
<b>Wind Dir &amp; Spd</b>	E 3-8 m/s	E 3-9 m/s
<b>Wave Height</b>	m 0.4-0.8	m 0.4-0.9
<b>Water Temp</b>		
<b>Outlook</b>		
Forecaster: abdul-jabbar chogan		





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- Point marine forecast including about 30 points in the north and south seas of the country with a credit interval of five days and 7 days in two shifts in the morning at 8 local time and in the evening at 6 pm local time with the help of implementing numerical meteorological model and numerical model including forecasting of side parameters And wind speed, wave height, etc. are exported.



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Wind and Wave Forecast for Location: Soroosh

Lat: 29° 06' 0" N, Lon: 49° 28' 59" E

Northing: m N, Easting: m E, UTM Zone: 39 R

Forecast start date: 1330Z28-Aug-2022, Forecast end date: 1330Z02-Sep-2022, Forecast window: 5 day

Wind Gust Warning: N/A  
Local Weather

From Sunday 18:00 IRDT to Fri  
Sunrise 06:47 IRDT, Sunset 19:30  
Visibility: 10 km  
Max Wind Speed (WS10): 13kts  
Max Significant Wave Height (Hs): 0.65m  
Min/Max Temperature (T2): - 0.5/1.5°C

- پیش بینی پنج روزه
- دو نوبت روزانه ساعت های ۸ و ۱۸ محلی
- بازه زمانی یک ساعته

Date			Conf	Winds					Total Sea					Swell			Weather	
Day	Date	Time		Wind Dir (deg)	WS10m speed (kt)	WG10m Gust (kt)	WS50m speed (kt)	WG50m Gust (kt)	Hs (ft)	Hmax (ft)	Tp (s)	Tz (s)	Wave dir	Swell H (ft)	Swell T (s)	Swell Dir	Temp 2m (°C)	Vis (km)
SUN	28-Aug	13:30		SW	7.52	8.27	11.26	12.39	0.65	0.75	1.83	1.52	NE	0.00	0.00	N		
SUN	28-Aug	14:30		SW	5.66	6.23	8.82	9.71	0.57	0.66	1.96	1.69	NE	0.00	0.00	N		
SUN	28-Aug	15:30		SW	4.89	5.38	7.79	8.57	0.54	0.65	2.14	1.84	E	0.00	0.00	N		
SUN	28-Aug	16:30		W	3.76	4.14	6.21	6.83	0.56	0.68	3.37	2.11	E	0.00	0.00	N		
SUN	28-Aug	17:30		W	1.85	2.03	3.37	3.71	0.61	0.73	3.08	2.36	E	0.00	0.00	N		
SUN	28-Aug	18:30		NE	3.22	3.54	5.43	5.98	0.65	0.78	3.04	2.60	SE	0.00	0.00	N		
SUN	28-Aug	19:30		E	8.08	8.89	11.97	13.17	0.69	0.82	4.16	2.80	SE	0.00	0.00	N		
SUN	28-Aug	20:30		E	11.39	12.53	16.08	17.69	0.75	0.90	4.09	2.62	SE	0.00	0.00	N		
SUN	28-Aug	21:30		E	11.81	12.99	16.59	18.25	0.92	1.10	3.94	2.12	SE	0.00	0.00	N		
SUN	28-Aug	22:30		SE	10.48	11.53	14.97	16.47	1.10	1.32	3.71	1.96	SE	0.00	0.00	N		
SUN	28-Aug	23:30		SE	10.56	11.61	15.07	16.57	1.15	1.38	2.27	2.00	SE	0.00	0.00	N		



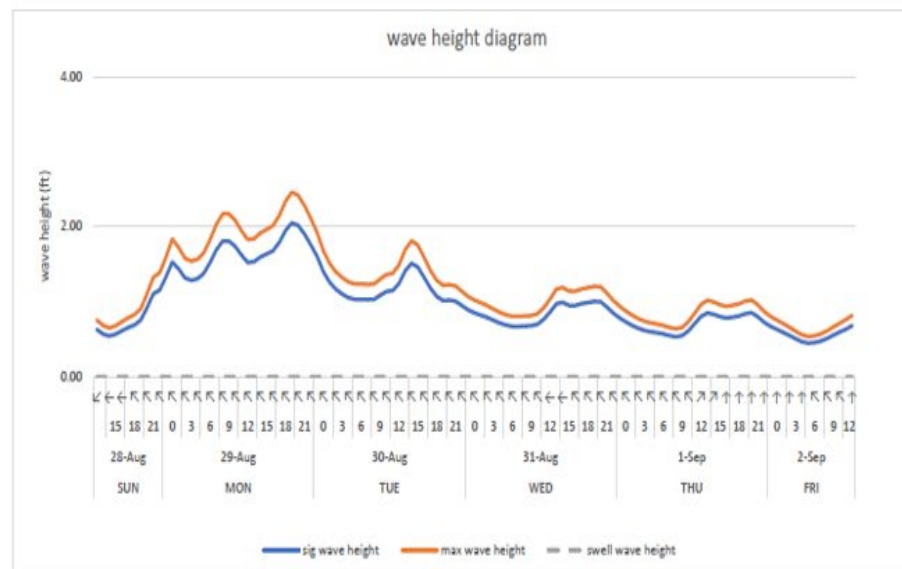
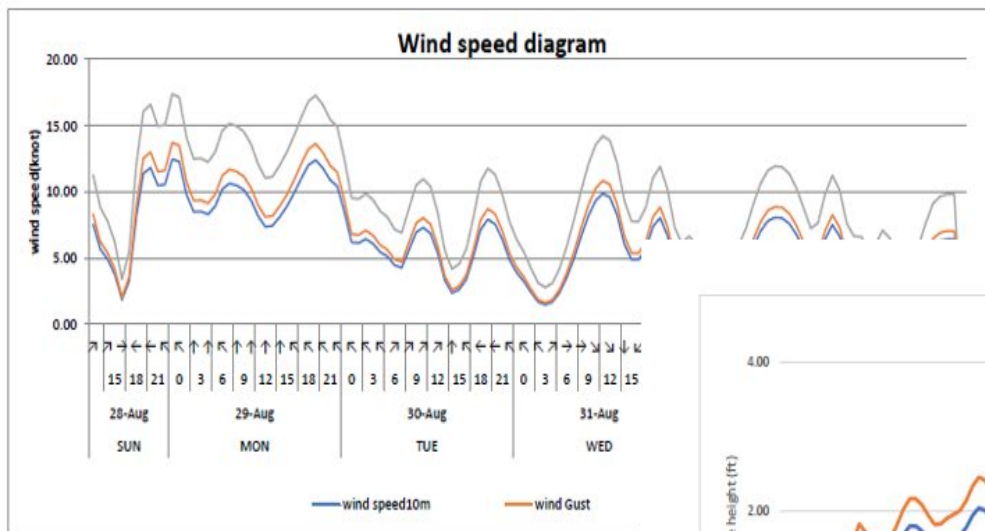
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## Marine Weather Bulletin

Gilan



12-Hours Marine Forecast From Mon 08-29-2022, 20 To Tue 08-30-2022, 08

### SYNOPSIS:

Astara		
	NEARSHORE	OFFSHORE
Visibility	2.2-4.4nmi LOC	2.2-4.4nmi LOC
Condition	CLEAR TO P.CLOUDY/CLOUDINESS INCR OCNL	CLEAR TO P.CLOUDY/CLOUDINESS INCR OCNL
Wind Dir & Spd	SE TO W 12 Knot	SE TO W 12 Knot
Wave Height	1.5FT	2FT
Water Temp	29C	29C
Outlook	INCR 2 Hpa - SMALL WAVELETS	INCR 2 Hpa - LARGE WAVELETS

Anzali, Kiashahr		
	NEARSHORE	OFFSHORE
Visibility	1.7-4.4nmi LOC	1.7-4.4nmi LOC
Condition	CLEAR TO P.CLOUDY/CLOUDINESS INCR OCNL	CLEAR TO P.CLOUDY/CLOUDINESS INCR OCNL
Wind Dir & Spd	E TO SW 14 Knot	E TO S 14 Knot
Wave Height	1.5FT	2.5FT
Water Temp	29C	29C
Outlook	INCR 2 Hpa - SMALL WAVELETS	INCR 2 Hpa - LARGE WAVELETS

Chamkhaleh, Roodsar		
	NEARSHORE	OFFSHORE
Visibility	2.8-5nmi	2.8-5nmi
Condition	CLEAR TO P.CLOUDY/CLOUDINESS INCR OCNL	CLEAR TO P.CLOUDY/CLOUDINESS INCR OCNL
Wind Dir & Spd	E TO SW 14 Knot	E TO S 14 Knot
Wave Height	1.5FT	2.5FT
Water Temp	29C	29C
Outlook	INCR 2 Hpa - SMALL WAVELETS	INCR 2 Hpa - LARGE WAVELETS

Forecaster: samira mohammadi

A dramatic photograph of a massive, curling blue wave crashing over a small boat. The wave is a deep, vibrant blue, and the water is turbulent. The sky is a clear, bright blue. The word "Thankyou" is written in a bold, orange, sans-serif font across the middle of the image, slightly to the right of the center.

**Thankyou**