Webinar on Transport in the Balkan and Black Sea region: Advancements in the port sector

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Ecological condition of the port of Batumi

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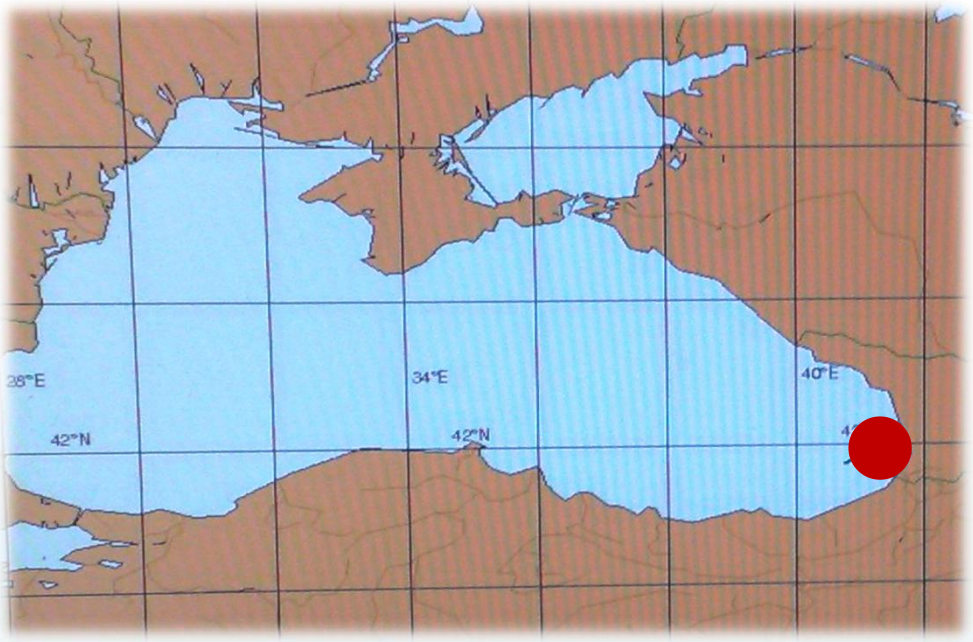
Batumi

The municipality of **Batumi** with approx. 200,000 inhabitants lays in the south-east part of Georgia directly on the coast of the black sea



IN 2008 STARTED BATUMI CITY WATER SUPPLY & WASTEWATER SYSTEM REHABILITATION PROJECT

The projects objective is to make a contribution to the socio-economic development of the area and to the protection of natural resources, limiting the environmental impact on the Black Sea ecosystem trought the rehabilitation the municipality's infrastructure (water supply and wastewater disposal) and providing the Adjarian coastal villages between Batumi and Turkish borders with the sewerage system

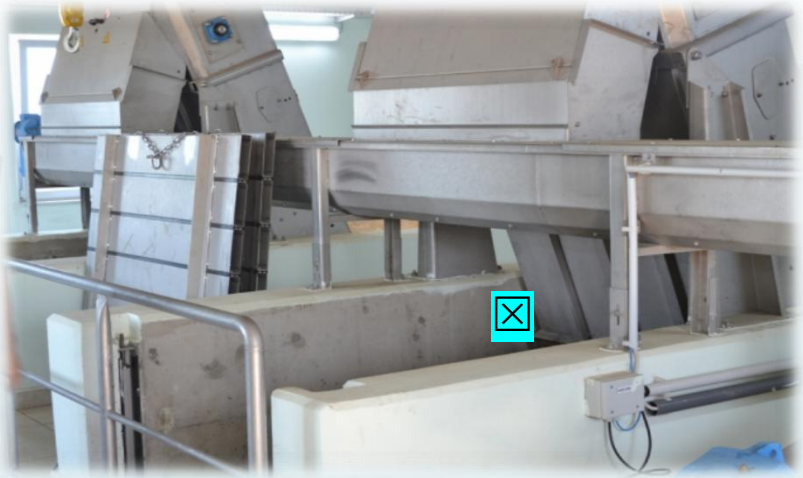
Solution

Based on the feasibility study the following measures are being implemented:

- Construction of waestwater treatment plant (1500 L/s)
- Rehabilitation and Construction the sewer of Batumi
- Rehabilitation of 2 wastewater pumping stations (800 L/s)
- Construction of 10 wastewater pumping stations
- Construction of full biology wastewater treatment plant (200.000 PE)
- Construction of a Sea Outfall pipe into the black sea (1.1 km)

Facts

The mechanical part is in operation since March 2012, and the Biological part was put in operation since August 2012



Anaerobic ponds

- Anaerobic ponds, 15,000 m^3 each, total 60,000 m^3
- 1 ground sludge remover $Q_{max} = 60 m^3/h$
- Primary Sludge max. = 7,700 kg/d
- 2 Pumps for each anaerobic ponds, Q_{max}=125 l/s, connected by GRP pipes 500 DN to the trickling filters

Sea Outfall

Sea Outfall 3 Pumps: $Q_{1\ pump}$=540 l/s: $Q_{3\ Pumps}$=1620 l/s

Total length of the Sea Outfall pipeline: 1097,2 m

Buried at sea bottom: 472,0 m

Unburied at sea bottom: 467,0 m

Depth of the pipeline in the sea: 40 m

Waste water treatment plant of Batumi have a Labor on site, where dairy is making the analysis on:

NH_4, Total N, Total P, COD, BOD_5, suspended solids and pH

The treatment efficiency is now about 80%

Sampling information

- Batumi Port Sampling station location

  Longitude 41.650911°

  Latitude 41.644562°

- Sampling period – 2017-2020

- Sampling frequency – monthly

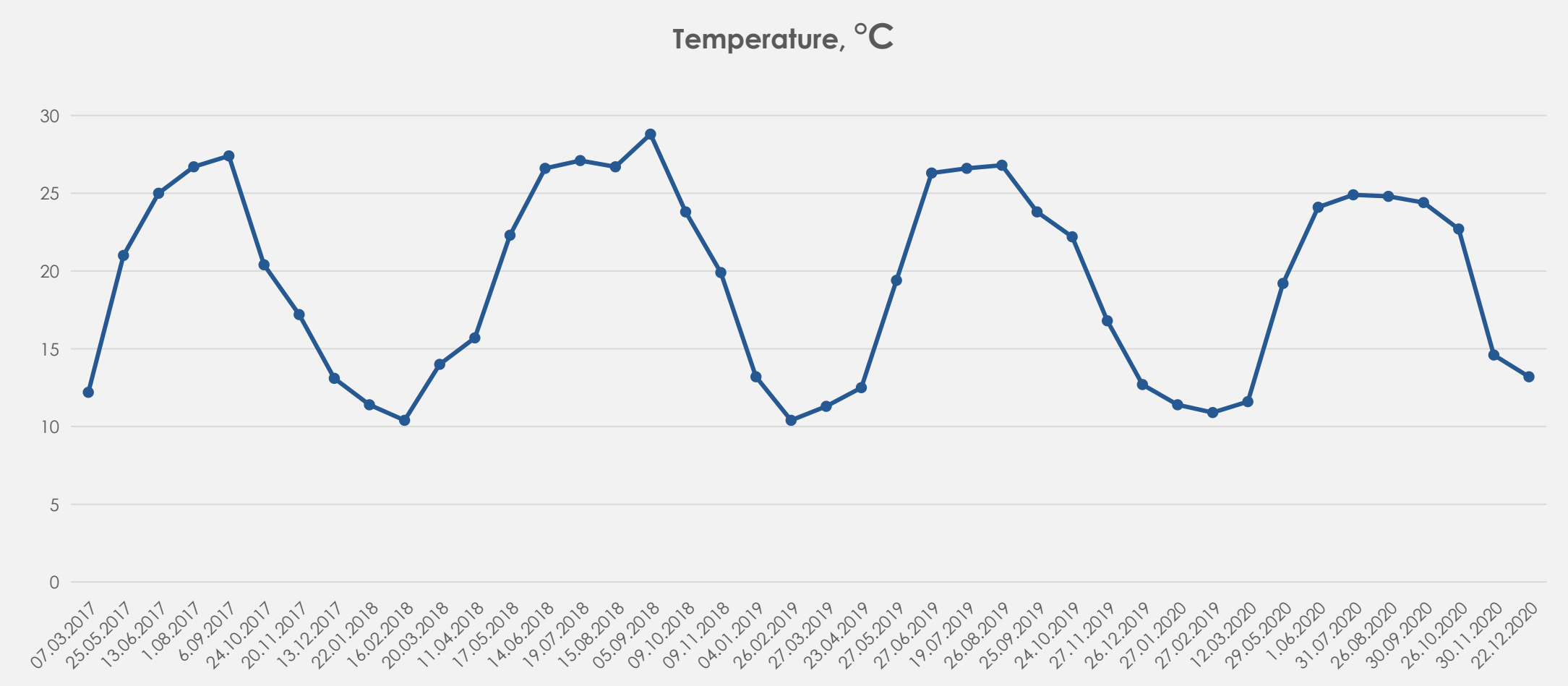
Batumi Port sea water quality control elements

Temperature
Salinity
Conductivity
Transparency
Turbidity
pH
Suspended matter
Dissolved oxygen
Ammonia NH_4
Nitrite NO_2
Nitrate NO_3
Silicate SiO_3
Phosphate PO_4

Salinity of the surface layer of Batumi port during 2017-2020 period

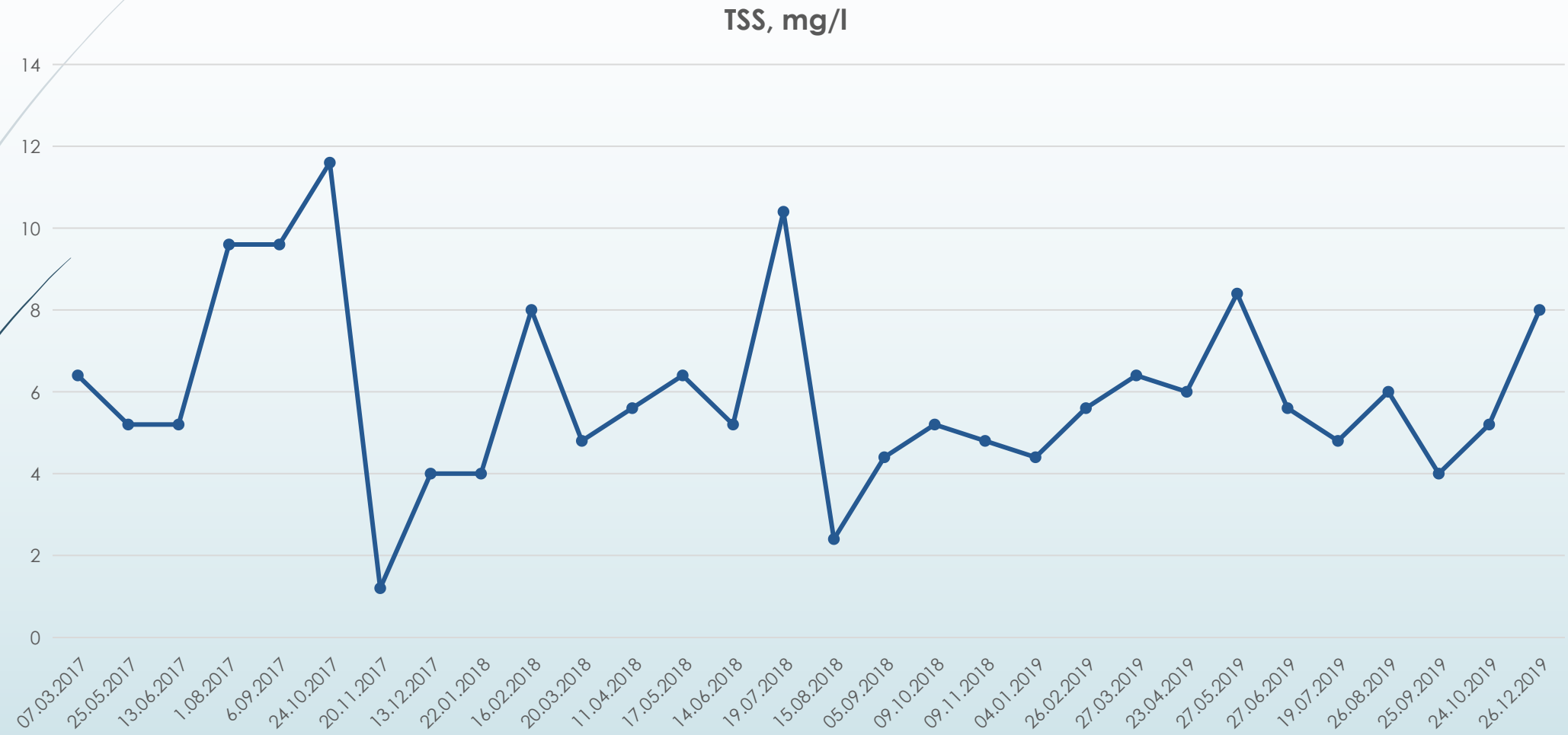
Salinity varied from 9.8 to 17.7 ‰. The average salinity was 14.0 ‰

Temperature value in the surface layer of Batumi port (2017-2020 period)



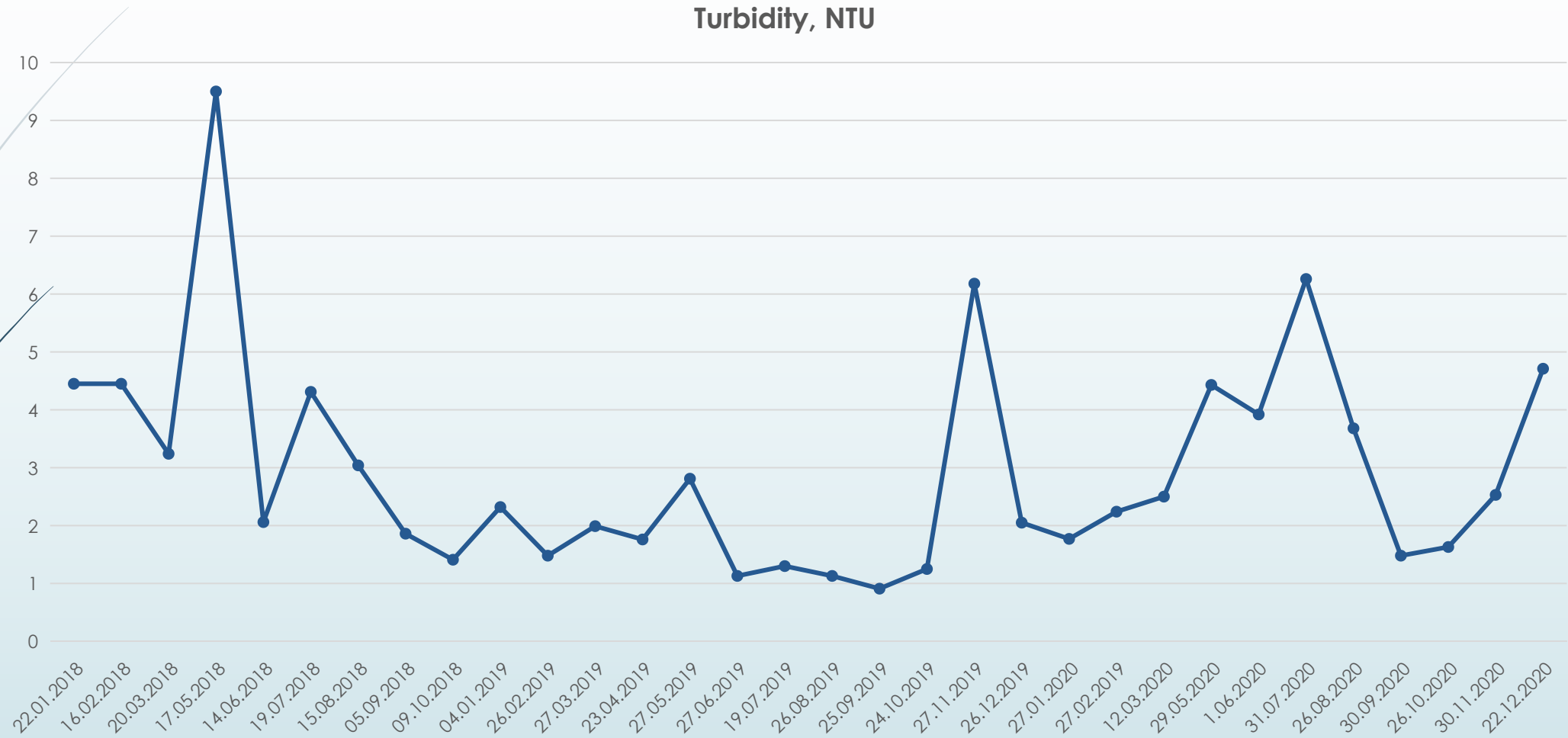
The average temperatute -19.4 °C. Minimum value -10.4°C (16.02.2018), maximum value – 28.8 °C (05.09.2018).

Content of total suspended solids in surface layer of Batumi port (2017-2019 period)



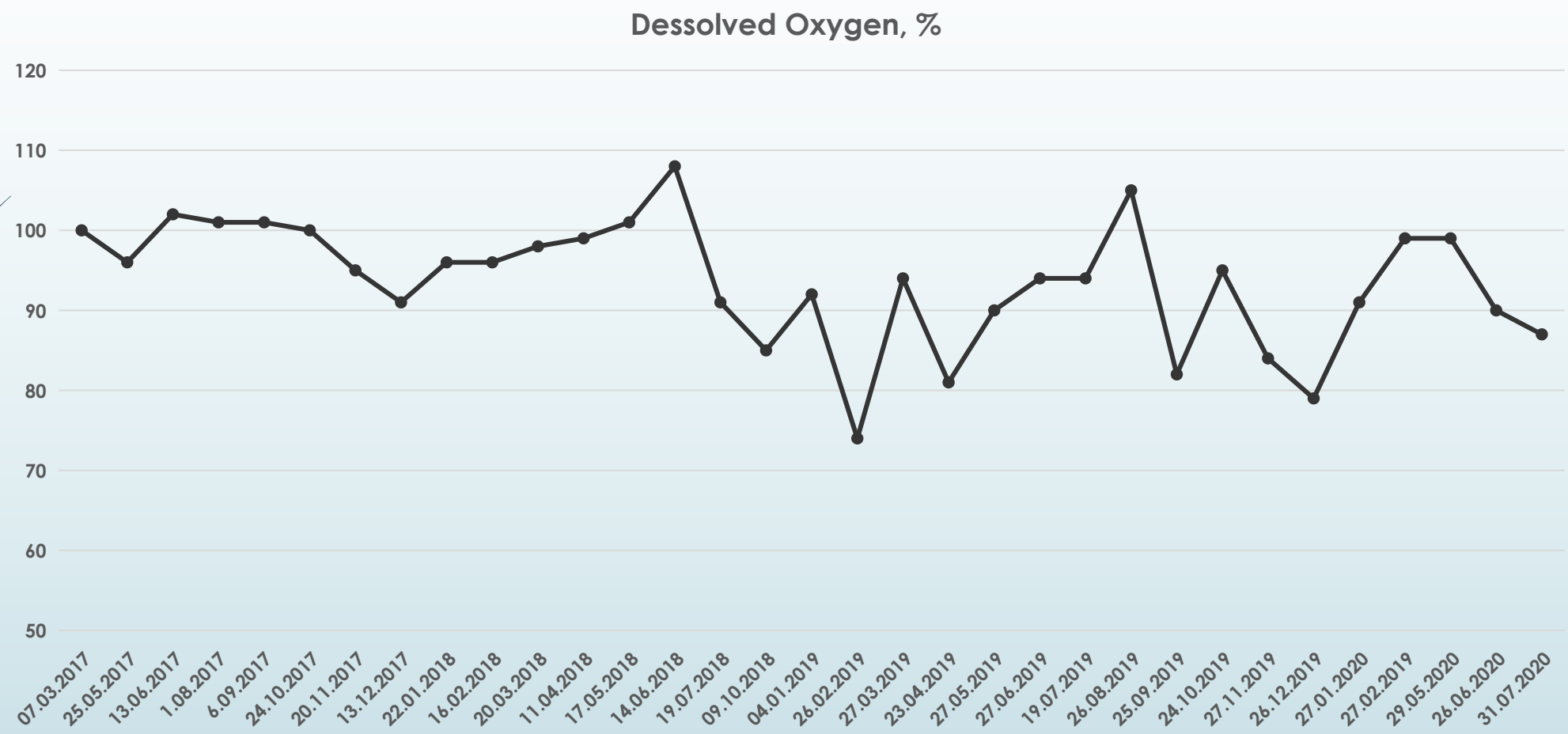
The average water transperency was 350-400 cm. Average concentration of total suspended solids – 5.95 mg/L

Turbidity value in surface layer of Batumi port (2018-2020 period)



Turbidity value of Batumi port surface layer vary from 0.91 to 9.5 NTU. Average value was 2.93 NTU

Concentration of Dessolved oxygen in surface layer of Batumi port (2017-2020 period)



BOD_5 value in surface layer of Batumi port (2017-2020 period)

Average value of BOD_5 in Batumi port surface layer

from 2018 to 2020 period was 2.21 mg/L

Summary results of nutrients value in Batumi port surface layer

	PO4, µmol/L	NH4, µmol/L	NO3, µmol/L	Si, µmol/L
Average	0.71	1.60	4.63	22.43
Minimum	>0.063	>0.469	>0.089	4.12
Maximum	4.24	6.34	23.56	75.16

25% of measurements PO4 concentration below the method LOD (<0,049 µmol/L)

47.8% of measurements NH4 concentration below the method LOD (<0,403 µmol/L)

The average concentrations of mineral nitrogen compounds in the time period from 2016 to 2020 were 10.87 µmol/L

Coat of arms of Georgia

“Strength is in Unity”


Thank you
for attention!