PM Ecology

Environmental monitoring solutions

MARINE MONITORING STATIONS

Monitoring of physicochemical parameters in seawater



WE DESIGN

WE BUILD

WE MAINTAIN

WE REPORT

PM Ecology

PM Ecology

We provide comprehensive marine measurements — from the physicochemical parameters of seawater, through currents and wave conditions, to meteorological data.

We don't just supply equipment. We design complete measurement systems tailored to the specific conditions and requirements of each project.

Redundant recording – no data loss if the logger fails – the system continues recording data for up to one month if the primary recorder or wired connections fail.

Real-time data, available 24/7 – continuous access to measurements from all connected sensors enables a rapid response to irregularities and failures.

UV antifouling – longer service intervals, lower operating costs – the UV system can extend the interval between sensor cleanings by up to three times, reducing biofouling and service visits.

Configurable sensor payload – sensors can be tailored to project requirements, with the platform easily expandable as needs evolve.

Compact platform – lower transport and installation costs – reduced system size and weight lower production and transportation costs while eliminating the need for large vessels.

PME-480 MEASUREMENT BUOY

All our measurement stations use the proprietary PME-480 power and transmission buoy, which serves as the system's central component.

The buoy facilitates power supply, data recording, and transmission of measurement information. Its sealed container accommodates a recorder, a communication modem, and a battery integrated with the ballast system. Additionally, the system is outfitted with GPS and AIS AtoN, allowing for continuous position tracking and ensuring adherence to IALA navigation marking standards.

The buoy is secured in the specified location with the use of two gravity anchors.
The configuration and apparatus of the PME-480 are illustrated in the figure below.

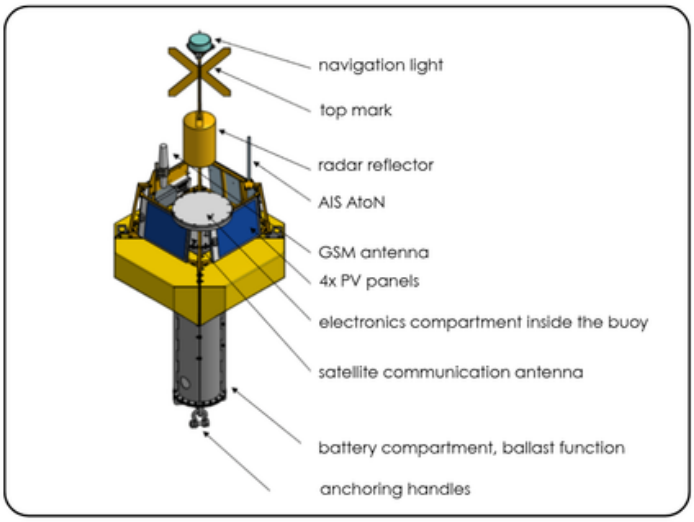


Fig. 1 PME-480 Measuring Buoy Source: Author's Research

The primary benefits of the PME-480 buoy

- It is equipped with a high-capacity battery of 10 kWh, enabling extended autonomous operation.
- More compact and lightweight than rival solutions offering comparable autonomy and functionality.
- Reduced transportation expenses.
- No need for large installation vessels
- Significantly lower overall system and operating costs

STATION FOR THE MEASUREMENT OF WATER QUALITY

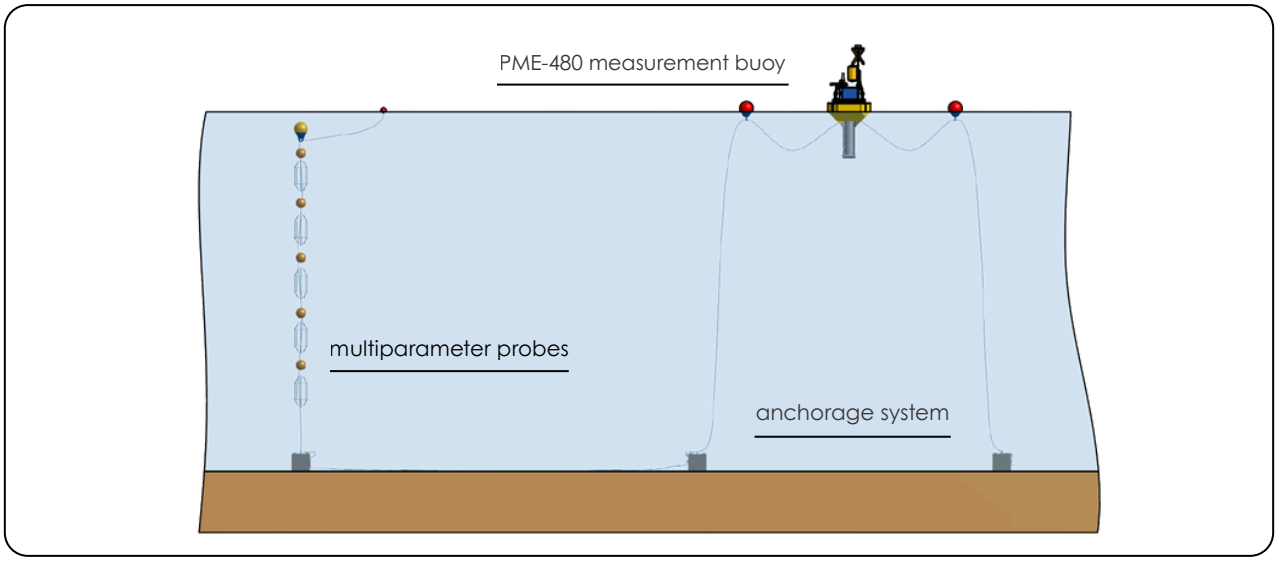


Fig. 2. Diagram of the measuring device - lateral section. Author's research

Station configuration.
The station comprises a PME-480 power and transmission buoy, an anchoring system, and a vertical measurement column outfitted with five multi-parameter probes.

Probe positioning.
Measurements may be conducted at various designated depths. Each probe is affixed to a measurement column and maintained in a vertical position by an independent float.

Configurable multi-parameter probe.
Each probe can be equipped with as many as seven measurement sensors, allowing for the simultaneous assessment of various physicochemical parameters at a single measurement location.

Design.
The probes are linked by a steel cable with a diameter of 10 mm and an additional cable. The column is attached to the buoy via a signal/power cable and a supplementary 10 mm diameter steel safety cable.

Materials.
The structural metal components are composed of 316L stainless steel, known for its corrosion resistance and suitability for prolonged use in marine environments.

The multi-parameter probe comprises the following components:

- a steel enclosure designed as a cylindrical cage, safeguarding the measurement sensors from mechanical damage;
- a sealed steel container containing a recorder equipped with a wired communication system adhering to the RS485 standard;
- an emergency battery that guarantees the device's functionality without external power for a duration of no less than 1 month;
- physicochemical parameter sensors positioned within the protective enclosure;
- a collection of UV diodes employed to mitigate biological fouling of measurement sensors (active anti-fouling system).

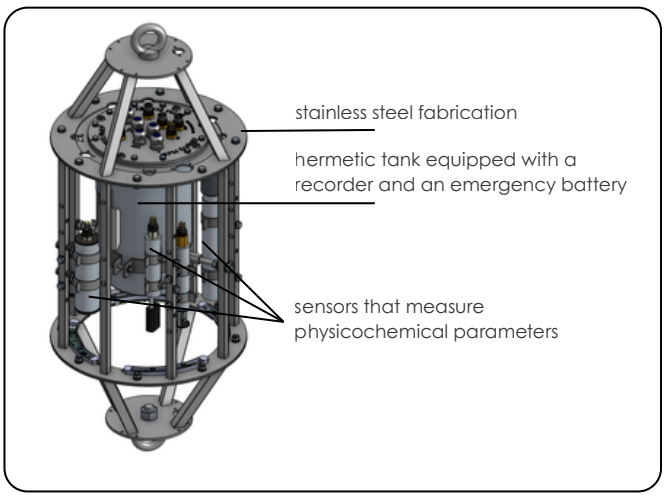


Fig. 3. Schematic representation of the multi-parameter probe - lateral and top cross-section. Author's research

The recorder regularly activates the sensors and archives measurement data in its internal memory. This data is subsequently transmitted through a cable to the recorder located in the measurement buoy, which aggregates information from the entire column and relays it to the Contractor's supervisory system via GSM or satellite communication.

Under standard conditions, the probe is powered by the primary system within the buoy. In the event of a cable failure, it automatically transitions to emergency power supplied by a battery, providing at least one month of backup power capability.

Sample measurement parameters

The multiparameter probe can be configured with any commercially available sensors, chosen based on project specifications. Below is an example of the parameters measured in a standard configuration:

- turbidity (NTU),
- dissolved oxygen (mg/L and %),
- temperature (°C),
- pH (pH scale),
- electrolytic conductivity (mS/cm),
- absolute pressure (bar),
- chlorophyll a (µg/dm³).

Technical specifications of sample sensors

Temperature	
Measuring range:	from -5°C to 35°C
Maximum temperature measurement error:	±0.002°C
Temperature measurement resolution:	<0.00005°C

pH	
Measurement technique:	potentiometric
Measurement range:	4–10 pH
Measurement precision:	±0.01 pH
Measurement resolution:	0.001 pH

Electrolytic conductivity	
Measurement technique:	induction
Conductivity measurement range:	0–25 mS/cm
Measurement precision:	±0.003 mS/cm
Measurement resolution:	0.001 mS/cm

Pressure	
Pressure measurement:	absolute pressure
Pressure measurement range:	0.8–11 bar
Maximum pressure measurement error:	±0.05% of full-scale temperature compensation; ±0.1% of the full scale within the remaining range
Temperature compensation range:	0–50°C

Turbidity	
Measurement technique:	optical
Measurement range:	0–4000 NTU
Measurement resolution:	0.01 NTU
Maximum measurement error:	<2% of the measured value or ±0.1 NTU (whichever is greater)

PM Ecology

info@pmecology.com +48 58 500 80 07 www.pmecology.com