



Monitoring for dredging and marine construction

During dredging and marine engineering projects, it is of great importance to closely monitor the effect of the works on the environment. For example, a dredging project may be close to a coral reef, or a new port may be constructed near fish farms or pristine beaches.

Waves, currents, tide (water level) and weather are very important for all work at sea. If waves get too high or wind gets too strong, it may be necessary to interrupt a project. Knowledge of currents is necessary to determine forces on constructions and ships, and to predict the spreading of fumes and pollution.

Observator can deliver a complete integrated monitoring system, including everything from the sensors to software for managing the acquired data. These systems include meteorological and hydrological sensors, (solar) power, data communication, data buoys, pole- or bottom-mounted platforms and web-based processing software.

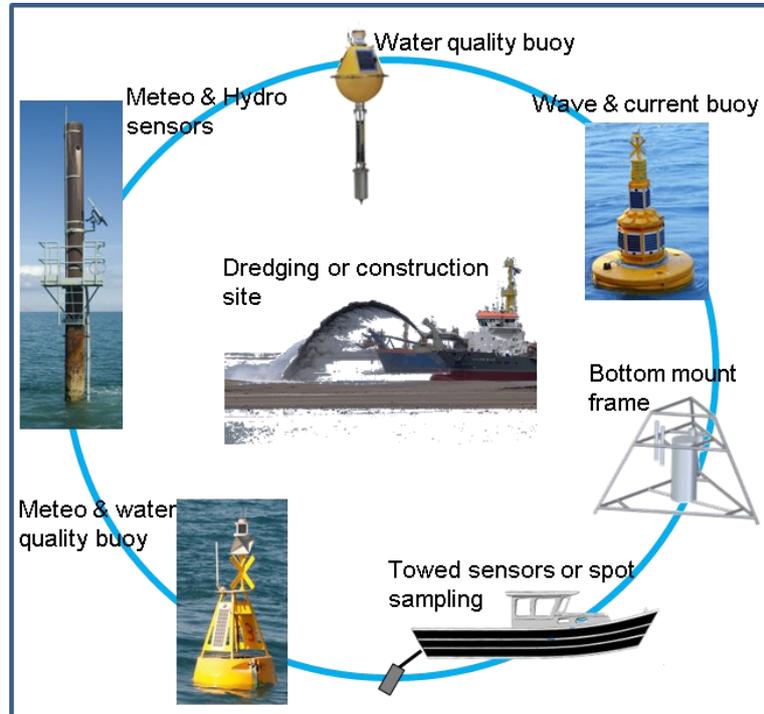
Sensor mounting options

As shown in the picture on the top-right side, sensors can be mounted in a number of ways:

- on data buoys;
- on measurement poles or other fixed platforms;
- on bottom-mounted frames;
- towed by a sailing boat or lowered from a boat for spot-sampling;

Data communication

The measurement data from a sensor is usually stored locally in a data logger before being transmitted to a central location. The transmission is done through either the mobile phone network, by radio communication or by satellite communication. These telecommunication systems usually link to the internet, which is used to transport the data to a server computer anywhere in the world. Alternatively, radio communication can also link the sensor and data logger directly to a computer if the distance is not too big.



Monitoring around a dredging or construction area.



OMC-7006 data buoy for monitoring water quality.
Diameter: 60 cm.



OMC-7012 data buoy for hydrological and meteorological sensors.
Diameter: 120 cm.

Monitoring for dredging and marine construction

Data processing by OMC-Data-Online

Data arriving at the central server is stored in a data base. Advanced software tools allow the user to process and visualize the data in a number of ways. For example: graphs and tables can be created; automatic reports can be generated; automatic alarms messages can be issued if certain alarm conditions are met. Users can access the data through a web-based interface supporting all common browsers.

OMC-Data-Online does the above processing for all measured data, irrespective of the source (buoy, platform, pole, ship or other).

OMC-7006 turbidity and water quality buoy.

This small buoy (see picture on the previous page) is a complete measurement station including solar panels, batteries, signal light, data logger, GPRS modem, GPS and so on. Optionally, the buoys can be equipped with a radio or Satellite (Iridium) modem. The buoy has a subsurface protective cage for installing water quality sensors. This buoy is often used to measure turbidity, but it can easily support a multi-parameter probe. For more information on sensors, refer to the corresponding section.

OMC-7012 data buoy

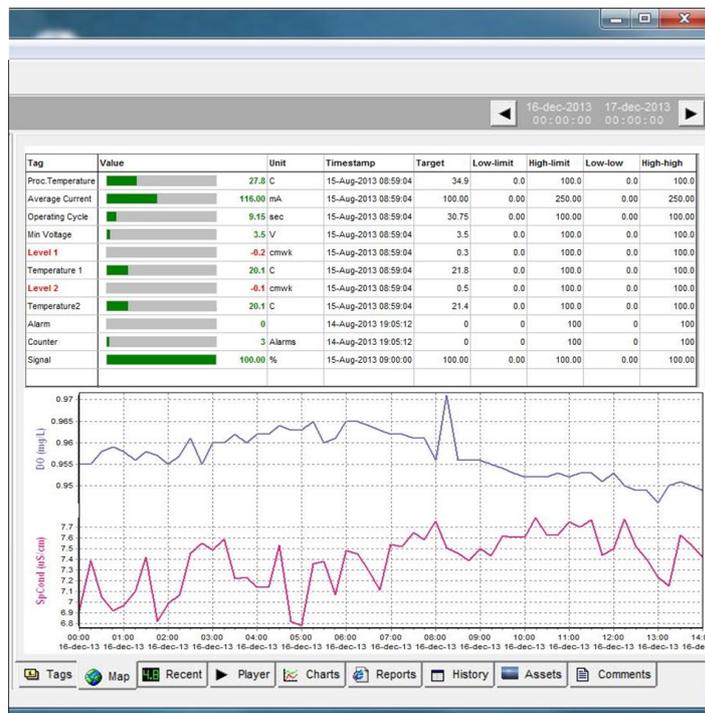
This 1.2 m diameter buoy (see picture on the previous page) is a complete measurement station including the same features as the OMC-7006. In addition, the OMC-7012 can also carry meteorological sensors, for example to measure wind speed and direction. The buoy can also carry an ADCP (Acoustic Doppler Current Profiler), for measuring the water current in a column below the buoy.

OMC-7018 Wave & current buoy

The 1.8 m diameter OMC-7018 can do everything the OMC-7012 can do, plus it can measure waves by using accelerometers, gyros and a compass. Thus it provides a complete platform for measuring waves, current, wind speed & direction, turbidity and more.

Poles and platforms

When fixed structures like poles and platforms are available, they can be used to mount sensors. For example, sensors for measuring water quality and current can be mounted below the water surface on a pole. Above the water line, meteorological sensors can be mounted on the same pole. Finally, solar panels and a cabinet with electronics can be mounted as well. Such a design will always be custom made, because user requirements differ too much for a standard design. However, the various components are standard.



OMC-Data-Online for data management, processing, presentation, reporting and alarming.



OMC-7018 Data buoy for wave, water current, water quality and meteorological parameters.

Monitoring for dredging and marine construction

Bottom mounted frames

A bottom mounted frame typically contains several sensors, a data logger and batteries. The frame is lowered to the sea bed and can be retrieved by simply hooking a rope to it. Alternatively, an 'acoustic release' can be used to release a small float that is tied to the frame with an unwinding rope. If online data is required, the data logger in the frame can communicate to the outside world by either a cable (connected to a nearby buoy) or by using an acoustic modem. If a cable to a buoy is used, the buoy can also provide power (from its solar panels) to the frame. Bottom mount frames are typically custom-made.

Towed systems and spot sampling

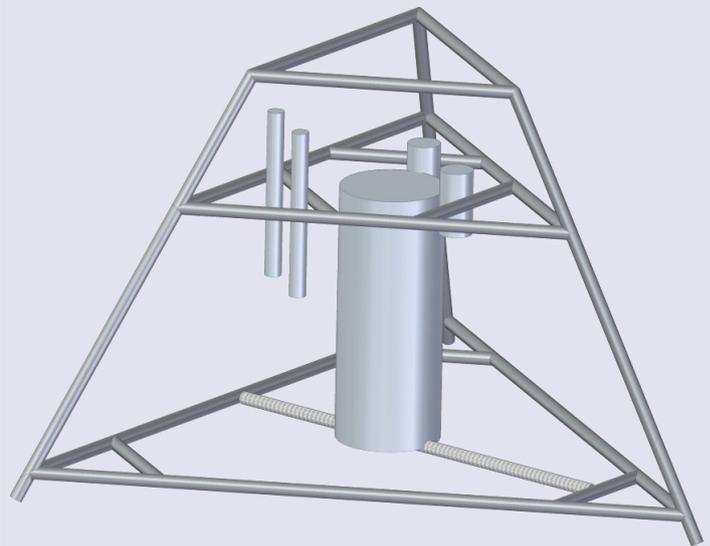
Sometimes a set of measurement stations at -more or less - fixed locations is not sufficient. A boat can be used to take additional measurements. Spot sampling can be done with any of the below water quality sensors, in combination with a handheld device, a laptop or a data logger. Observer also delivers towed systems, where several sensors are towed by the vessel on a single line. Each sensor measures at a different depth, stabilized by a wing.

Turbidity sensors

The most measured parameter during dredging and marine construction projects is turbidity. The Analite series of turbidity probes has set the standard for this for many years. Beginning 2015, Observer introduced the Analite NEP5000 series of turbidity probes. These probes offer unprecedented accuracy and stability at extreme low NTU values. This allows the NEP5000 to be used in crystal clear waters. The optional copper alloy housing and the automatic wiper provide the sensor with excellent anti-fouling properties.

Water quality sensors

Commonly measured water quality parameters, other than turbidity, are: temperature; conductivity (salinity); Dissolved Oxygen; pH; Blue-Green Algae; Chlorophyll; Photo-synthetically Active Radiation and more. Observer has a huge experience in integrating the 6-series and the EXO series of sensors from YSI/Xylem, but is not limited to these sensors.



Bottom mounted frame with several sensors (example)



NEP5000 turbidity sensor with pressure sensor, protective shroud, copper-alloy housing and wiper.



YSI/Xylem Multiparameter probes. EXO series and 6-series.

Monitoring for dredging and marine construction

Wave and Current sensors

Observer has a rich experience in integrating wave and current sensors from several leading manufacturers. The sensors can be used on buoys, poles or on bottom-mounted frames.

Meteorological sensors

Observer Instruments has a large range of meteorological sensors for offshore and marine applications. These sensors have the robustness and reliability required for application during dredging and marine construction projects. The most common parameters for this application are: temperature; barometric pressure; wind speed & direction. Also encountered are visibility and solar radiation.

Data loggers and modems

Whatever platform (buoy, pole and so on) is used, some form of data logging and communication will be required. All buoys have their own standard loggers and can house GPRS, radio and satellite modems. For other platforms, Observer can offer similar solutions. Our OMC-045-III logger is used in the OMC-70xx buoys and includes an integrated GPRS modem as well as a GPS receiver. It can connect to radio and satellite modems.

Product brochures

Separate brochures are available for all shown individual product. Please visit our website to download the brochures.



Sontek SL500 Horizontal ADCP for measuring a horizontal current profile. Instruments for measuring vertical profiles are also available.



OMC-116 Acoustic wind speed and direction sensor for Marine applications



OMC-406 Temperature and humidity sensor.



OMC-045-III data logger with integrated GPRS and GPS



Iridium satellite modem module for OMC-045-III



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