

International Marine and Dredging Consultants (IMDC) is an engineering and consultancy company specialized in a vast range of water related projects. Our highly qualified staff offers advice based on recent research results of leading universities and research institutes and hands-on experience acquired throughout the years.

One of IMDC's core activities are specialized field measurements. The vast range of services that we can offer in this domain are presented in this product sheet.

More information can be found on our website: [www.imdc.be](http://www.imdc.be)

# Monitoring

Monitoring is a crucial aspect to improve the understanding of the natural water environment and related processes. Availability of sufficient high quality data sets is a key element to solve our client's questions. Therefore, IMDC offers versatile monitoring services and consultancy, assisting clients with any of their water-related monitoring needs.

For every assignment our dedicated team will look for the most optimal monitoring set-up and apply specific protocols or techniques in accordance to the relevant (international) standards. To obtain reliable and high quality data, IMDC can rely on a versatile set of measurements instruments, data processing tools and an experienced team of monitoring specialists. For each study the most suitable and innovative monitoring device or technique will be specified, independent of any sensor manufacturer or equipment supplier. Should the most appropriate measurement device not be commercially available, it can even be developed in-house by IMDC (e.g. SiltProfiler).

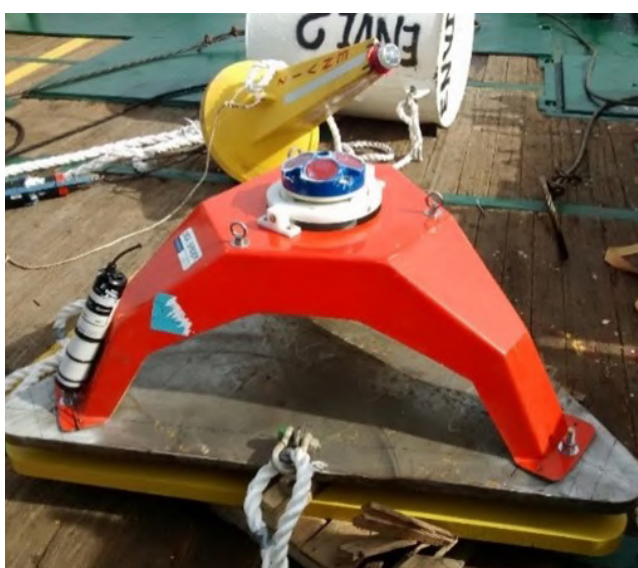
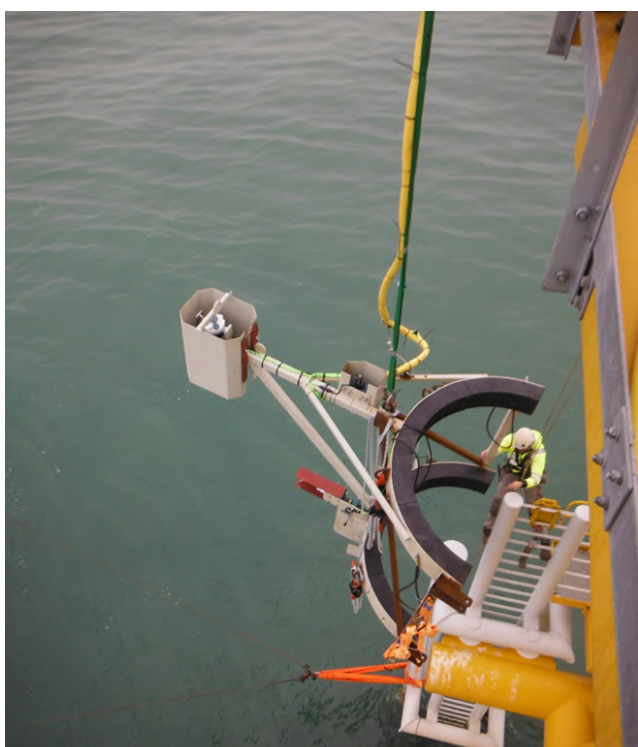
Data acquired by IMDC can be validated, presented and analyzed by means of in-house developed web-based Synapps platform. Data processing is done in accordance to the IMDC quality manual and its related procedures. This implies that a dedicated measurement plan is being compiled prior to the start of each campaign, covering all aspects of the measurement campaign, with specific focus towards quality and health & safety, in line with IMDC's ISO 9001:2015 certification.



# Services

## Meteorological and Oceanographical (MetOcean) surveys

Any marine/estuarine infrastructure or renewable energy project requires long or short-term MetOcean monitoring. IMDC can provide long-term measurements of waves, currents and wind by means of stationary buoys or seabed frames, adding extra sensors to record any additional parameter (i.e. turbidity, water quality, etc.). To monitor phenomena on a shorter timescale (i.e. complete tide cycle) mobile measurement campaigns are being set up. This survey service complements our broad range of MetOcean services: desk studies, numerical modelling, hind- and forecasting systems, data management and data analysis.



## Meteo-hydrological monitoring

Sustainable river basin management requires an integrated approach, based on a broad hydrologic and hydrodynamic expertise. IMDC offers a wide range of related services, including detailed river modelling, real-time flood forecasting, potential flood area mapping, floodrisk analysis and floodrisk management. These services are based in field measurements as provided by IMDC: surface- and groundwater levels, water discharge, precipitation and sediment transport.



## Sediments

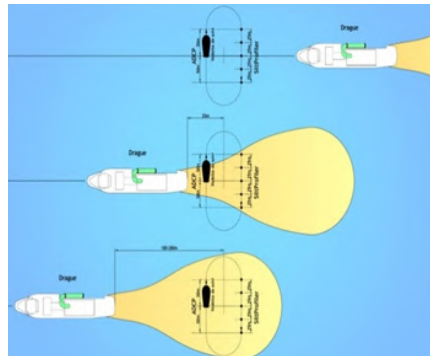
To evaluate effects of marine works or infrastructure on the hydrodynamic and morphologic system IMDC has an extensive range of instruments and protocols available for spatial and temporal mapping of effects associated with transport/behaviour of sediment, water temperature and salinity. Measurement campaigns could aim to map/determine :

- Scour effects around wind turbine foundations;
- Sediment influx and thermal dispersion at an inlet or outfall;
- Density currents due to lock operation or construction of a tidal dock;
- Consolidation of bed sediments during infrastructure works;
- Environmental impact of the dredging works producing sediment plumes

Those observations will lead to effective mitigation measures and provide tools for processes or activities follow-up.



*Measurement campaign of a dredging plume*



*In house developed SiltProfiler*

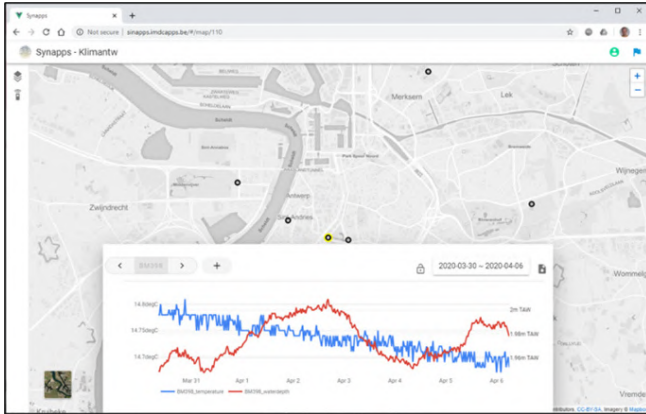
## Environmental monitoring

Good water quality is a requirement for the conservation of wetland, river ecosystems and human health. IMDC's environmental monitoring campaigns allow to follow-up and gain insight in water quality evolution, by monitoring parameters like turbidity, ammonia, nitrate, e. coli bacteria, oxygen, etc.



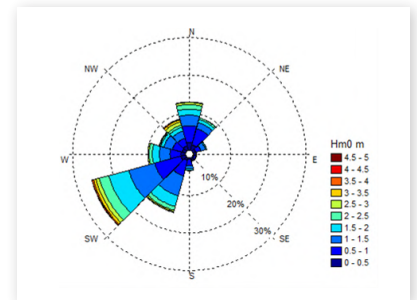
## IoT for water management

Water managers cannot always be present on site. IMDC therefore developed Hydrottools, inter- and cloud-connected sensors for more sustainable, efficient and cheaper water management applications. IMDC's Internet-of-Things solutions offer the possibility to quickly create a cost-effective and low-maintenance sensor-network to collect and visualize real-time data in our in-house developed Synapps platform. Typical Hydrottools applications are groundwater and drought management, waterquality, support for climate adaptation policy and flood-risk management.



## Monitoring consultancy services

IMDC is able to support its clients with its extensive expertise in marine monitoring, which can be applied for port & marine infrastructure, offshore wind, floating renewables, marine aquaculture, navigation, etc. Offered services include: identification of critical monitoring parameters, compilation of terms of references, elaboration of monitoring plans and follow-up of 3rd party monitoring (i.e. FliDAR), to ensure complete and qualitative datasets are being collected for application in the subsequent studies.



## Key references



### Sediment monitoring campaign for construction of a cooling water system (2018-2022)

UK

Client: Confidential

For the construction of a power plant cooling system, pits were dredged to install water intake and outfall structures. As high sedimentation and fluid mud are known to occur in the project area, a risk for gradual sedimentation in these pits prior to intake and outfall installation was identified.

IMDC performed an extensive sediment monitoring campaign to monitor occurrence of fluid mud in the pits and mud characterisation. This was done by combining different measurement equipment (DensX, SiltProfiler, SBE and ADCP).

Two years later, a follow-up measurement campaign was performed to assess the long-term sedimentation behaviour in the pits by studying thickness & density of fluid mud and consolidated mud in the pits, and its evolution since the pit construction.

### Sustainable Development Goals



### Sensors city of Antwerp (2018-2024)

Belgium

Client: City of Antwerp

The City of Antwerp maintains a permanent monitoring network of environmental parameter sensors on their territory to support the city's climate actions and policy. IMDC was and is responsible for the installation, calibration and maintenance of this sensor-network with a real-time connection to the client's IoT-platform. The sensor network includes rain gauges, water level sensors for monitoring of surface- and groundwater, and sensors to measure discharges in a sewage system. All the real-time data are also managed, validated and consultable in IMDC's platform Synapps – Meetnet.

### Sustainable Development Goals



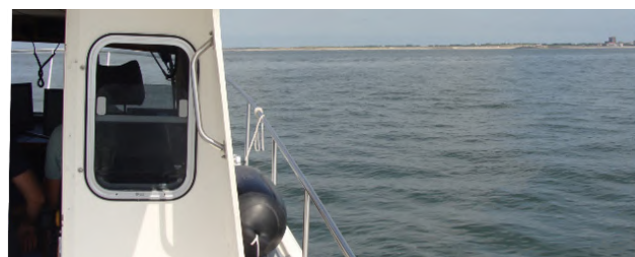
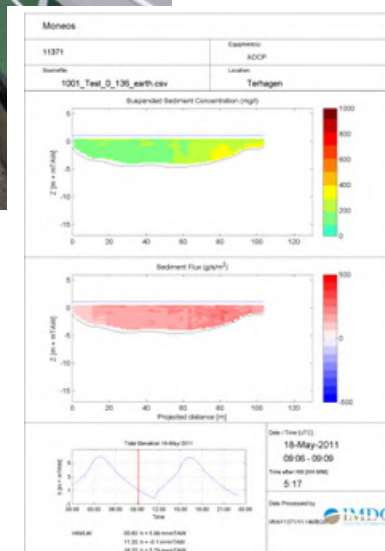
## Study of the impact of the Sigma plan, dredging activities and harbor expansion on the environment of the Sea Scheldt (OMES) (2011-2025)

Belgium

Client: De Vlaamse Waterweg

Since 1995, the Flemish authorities have started an extensive monitoring and research program on the Sea Scheldt (Belgium) to evaluate and monitor the effects of major interventions on the environment. This program, called OMES, consists of different parts that are carried out by different research teams with international scientists. Various environmental parameters are measured at approx. 20 fixed measurement locations across the rivers Seascheldt and Rupel at least monthly. In addition, a number of 13-hours measurement campaigns are performed annually to determine the behavior of the environmental parameters over a tidal cycle and at certain locations. Within this monitoring and research program, IMDC acts as partner of University of Antwerp and is responsible for obtaining and investigating all data of suspended sediments and hydrodynamics. Therefore, IMDC uses several measuring techniques and devices e.g. ADCPs, CTD-OBS, samplers and LISST. More information of the OMES project could be found on <http://www.omes-monitoring.be/en>.

### Sustainable Development Goals



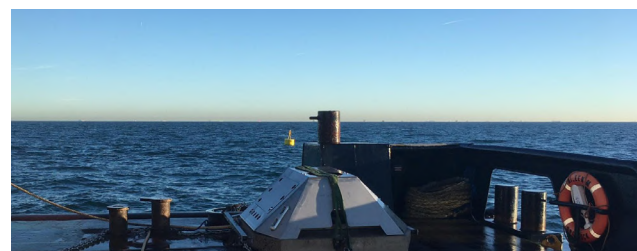
## Discharge- and salinity measurements Rijkswaterstaat (2018-2023)

The Netherlands

Client: Rijkswaterstaat

As manager of the infrastructure network in the Netherlands, Rijkswaterstaat collects physical measurements of the main water system. The collected data is used for multiple purposes of which one is to provide data for research and calibration of existing models. These models offer decision support to the water manager Rijkswaterstaat with regard to shipping, recreation, drinking water companies, deposits, etc. Within this framework, IMDC has been active as a partner of IGL and performs salinity measurements near Rotterdam and IJsselmeer, discharge measurements in various Dutch inland waterways and through-tide current- and discharge measurements in the Scheldt estuary.

### Sustainable Development Goals



## Metocean Campaign Princess Elisabeth Energy Island (2021-2022)

Belgium

Client: Elia Asset NV/SA

For the development of the world's first artificial energy island, IMDC defined a scope for a metocean campaign to acquire the necessary data on the site conditions and provided the datasets for validation of the project's numerical modelling. The monitoring scope executed by IMDC consisted of 6 months of stationary monitoring, by means of a seabed frame and through tide mobile measurements. All measurements were performed on the Noorhinder sandbank upon which the energy island it to be built.

### Sustainable Development Goals

