

Site Risk Assessment

Monitoring and analysis of environmental conditions surrounding aquaculture sites for evidence-based management of potential risks

The NextOcean Site Risk Assessment service features two components:

1. the MetOcean data, which provides maps of environmental conditions including winds, currents, surface temperature, sea level and tidal elevation;
2. Marine heatwave early warning, providing advance notification of anomalous increases in temperatures that will impact the marine environment.

These two components can be purchased individually, to assess various environmental threats according to organisational needs. The Site Risk Assessment service can benefit the following users:

Aquaculture Companies

- ✔ MetOcean forecasts and marine heatwave early warning detection allow monitoring so that cages can be secured, protected, or submerged.
- ✔ Historical MetOcean data and marine heatwave detection can be used to assess the conditions over a long time period for an area under consideration for a new aquaculture site.

Insurance Companies

- ✔ Using the MetOcean and the new early warning for marine heatwaves, they may be better able to assess the risks associated with operating a fish farm.

Aquaculture Service Providers/Consultants

- ✔ By integrating NextOcean data into their own systems and platforms, service providers or software developers can build monitoring capabilities into their own client offerings.
- ✔ Consultants may conduct risk assessments on behalf of their aquaculture clients.

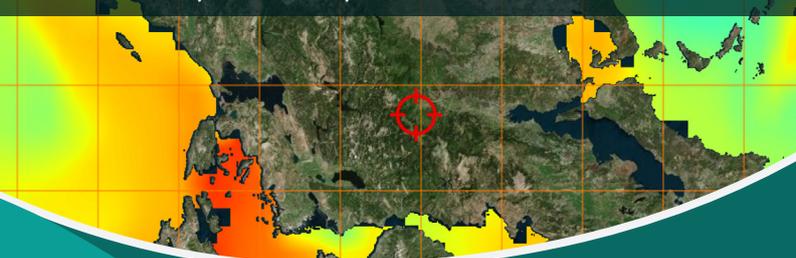
Maritime Regulatory Authorities

- ✔ Historical data can be used to assess the long-term conditions for an area under consideration for aquaculture activity.



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services

Sea surface temperature map from the MetOcean service

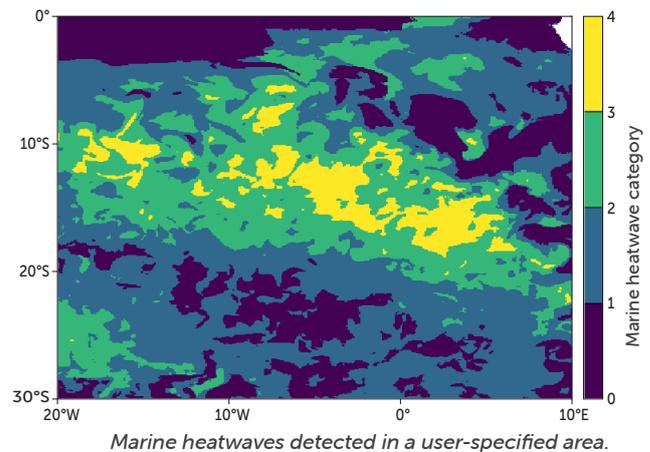


Service specifications

Key specifications	Marine heatwaves early warning	MetOcean service			
Data/satellites used	CLS marine heatwave indicator calculated from CMEMS global model	Meteorological and oceanographic datasets from CMEMS, NOAA and CLS			
Spatial coverage	Global	Global coverage			
Spatial resolution	1/12° or ~ 8km				
Frequency	Daily 5 day forecast	Product	Resolution	Update	Coverage
		Sea surface temp.	2-4km	Daily	Global
		Ocean currents	12.5km	Daily	Global
		Weather forecast	12.5km	Daily	Global
		Sea level anomaly	12.5km	Daily	Global
Data format from NextOcean store	NetCDF format	NetCDF format			
Visualisation in NextOcean Portal	Not available	Not available			
Data feed via API	Yes (CLS Motu API)	Yes (CLS Motu API)			

Early warning of marine heatwaves is of critical importance to any form of aquaculture activity as the fish growth and survival are directly linked to environmental conditions such as water temperature. By knowing in advance the level of risk due to exposure to a heat wave, fish farm managers can plan the appropriate action such as adapting the feeding strategy or in the worst case scenario moving the cages to a less exposed area.

To allow for an early warning system, the daily sea surface temperature prediction is derived from the CMEMS global forecast model and compared to a historical mean. When the temperature at a given location exceeds a predefined threshold over a specified time (5 days), a risk indicator is calculated based on the intensity of the event (in time and excessive heat). Users are provided with a dataset file over a specific geographic area for the next 5 days enabling the visualization of the risk indicator with the appropriate software/web-based interface.



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