

iFADO Good practice: Arctivities, a coastal service dedicated to fishing, aquaculture and maritime safety in Arctic.



NOVELTIS and QuietOceans developed an innovative service able to provide answers to stakeholders of the current and future Arctic industries not yet been satisfied by previous services.

Arctivities is an operational service providing seafarers with indicators which characterize the danger related to the safety of activities at sea (transport, fishing, aquaculture, renewable energies) as well as “their environmental impact” on biodiversity in terms of noise pollution.

An operational service in Arctic:

The Arctic zone is one of the regions which will know the biggest maritime boom in the coming years. Indeed, due to the global warming and the reduction of the freezing period, fishing and aquaculture activities are doomed to develop. Moreover, with the multitude of issues related to the opening of maritime routes, the knowledge and the anticipation of risks in the Arctic is an essential stake to guarantee its development.

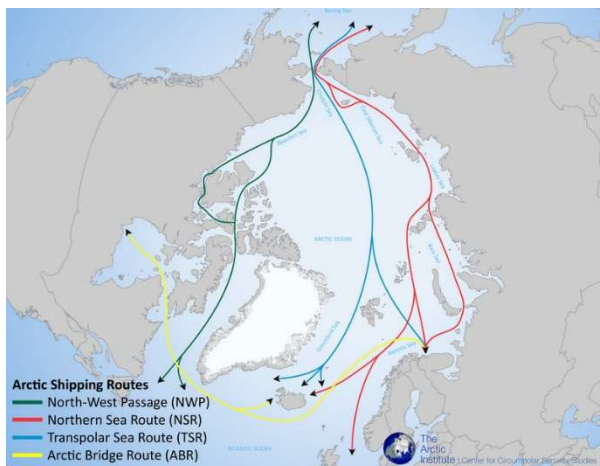


Figure 1 : Existing Arctic maritime roads

Arctivities service makes it possible to:

- evaluate and follow the environmental risk of the human activities on the halieutic resources, the aquaculture farms and biodiversity
- optimize the location of aquaculture activities and those likely to impact fisheries resources and biodiversity
- enhance the safety of marine infrastructure and shipping

Technology and CMEMS products valorisation

This service is the result of an important work on CMEMS products in order to provide relevant indicators in terms of risks and MSFD.

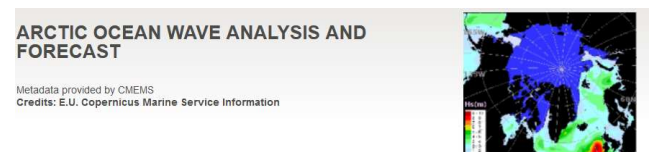


Figure 2 : CMEMS Waves products used to provide forecast at a coastal scale

Noveltis have been working for 20 years for the space and maritime industry. The numerous collaborations with the major players in each of these sectors have enabled us to develop innovative operational solutions, real decision-making tools for our clients. NOVELTIS currently has a large catalog of operational services:

- **TIPS**, Tidal Prediction System :
<https://savas.noveltis.fr/>
- **SAVAS**, Forecast of Extreme and Rogue Waves:
<http://tips.noveltis.com/>
- **POTEM**, Potentiel Tunisien en Energies Marines :
<https://potem.noveltis.fr/>
- **CSSA**, Chartering & Shipping Services SA :
<https://cssa.noveltis.fr/>
- **CAMS**, l'énergie solaire pour tous :
<https://cams.noveltis.fr/>
- **TidEA**, Tidal ENergy Assessment:
http://tidea.io/tidal_energy/
- **OLTC**, Altimeter Open Loop Tracking Command for Hydrology Monitoring :
<https://www.altimetryhydro.eu/>

Arctivities service provides operational solutions of waves, sea ice cover and associated indicators of ice accretion or vessel types in order to inform stakeholders about risk encountered in the Arctic area.

Quiet-Oceans develops and operates Quonops®, an operational system for monitoring and predicting anthropogenic noise at sea. Like oceanographic or meteorological prediction systems, this powerful and patented platform (Folegot, 2009) produces an estimate of spatio-temporal distribution of noise levels generated by all human activities at sea: including maritime traffic (Folegot 2010), oil prospecting operations, military exercises for submarine warfare, and construction and operations, sea of fossil fuel extraction, construction and operation of offshore wind turbines, drilling and blasting underwater, etc.

The data produced by Quonops® covers needs as defined in existing and emerging national and international regulations regarding pollution levels and the preservation of habitats, marine ecosystems and the protection of marine species (Folegot & Clorennec, 2015).

It offers a new knowledge of sound pollution through a mapping of distributions and makes it possible to apprehend both acoustic components of impact studies, dedicated to different normative needs such as the Marine Strategy Framework Directive (MSFD).

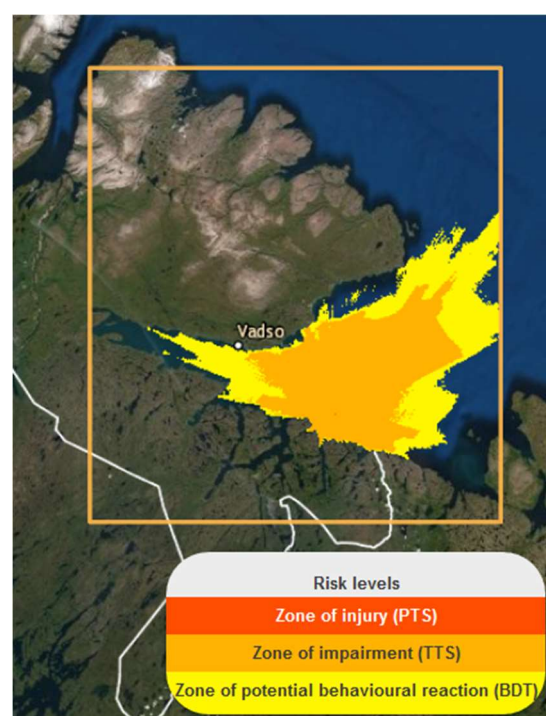


Figure 3 Quiet Ocean marine ecosystem risks

To sum up, here are the data provided by the Arctivities service:

Statistical indicators:

- ✓ Waves statistics from 20 years of NOAA data pending the availability of CMEMS reanalyses of waves, classification of best sites for aquaculture and risk levels for insurance,
- ✓ Monthly rate statistics accretion of ice on ships,
- ✓ Temperature statistics from reanalysis CMEMS, classification of the best sites (low variability) for aquaculture to ensure profitability.

Marine risk forecast indices:

- ✓ Downscaling wave forecasts for the calculation of aquaculture site exposure and vessel safety (fishing and transport) in areas. Prediction risk levels are calculated based on vessel size / height,
- ✓ Icing Index Forecast (ice accretion rate on structures),
- ✓ Freeze Forecast translated into compatible vessel classes for navigation and location of the ice edge,
- ✓ Temperature and salinity forecasts (threshold crossing alert) for the management of aquaculture farms and fishing.

Ambient noise and risk indicators for ice-free water noise:

- ✓ Ambient noise maps,
- ✓ Temporal and spatial ambient noise statistics,
- ✓ Risk maps by species.

Other information envisaged according to availability of data:

- ✓ Bathymetric data for aquaculture, energy prospecting etc ... (depth range),
- ✓ Data on the nature of the funds for aquaculture (type of substrate).

NOVELTIS and **Quiet-Oceans** also capitalize forecasts bulletins to consider the provision of statistical information on trends in the indicators provided.

Stakeholders and beneficiaries

This service is the result of a tight collaboration between the **NOVELTIS** and **Quiet-Oceans'** teams. Both team use its expertise to deliver high-level products and indicators using CMEMS data.

The service is intended for a wide range of end-users, which are summarized below:

- insurance companies;
- developers of offshore aquaculture farms;

- To the actors of the maritime transport;
- In the fishing industry;
- At the governmental authorities (European, state);
- Academic organizations;
- Other maritime operators (EMRs, Oil & Gas);
- Etc.

The expectations and the interests brought to our service are multiple according to the sectors of activities concerned.

Shipping:

- To date, maritime transport in the Arctic is an important economic issue and despite the existence of numerous cartographic services, users are not aware of the Copernicus Marine Service or the products available. Because of the contacts made and the relevant selection of CMEMS products, NOVELTIS and QUIET-OCEANS will proceed with the valuation of these products by calculating the maritime risk indicators necessary to better plan operations at sea.

Aquaculture:

- With an annual growth rate of 8.8%, aquaculture will account for 60% of global seafood consumption in 2020 (FAO, 2012) as catch fisheries at sea can only grow in a more limited way. Aquaculture will require the optimization of its performance in terms of energy use and securing production sites.

Insurance companies:

- This service is also motivated by several solicitations from insurance companies (shipping, tourism and aquaculture) in search of centralized information and translated according to their needs. The insurance companies define their policies according to the risks inherent in the roads and the types of chartered boats.

Maritime Spatial Planning:

This service is part of the planning of the Maritime Space as it will provide information and indicators to support the development and safety of aquaculture sites.

Results and keys to success

By their respective historical activities, **NOVELTIS** and **Quiet-Oceans** are involved in Arctic activities and have developed solutions for a large network of users.

With their respective expertise in operational services for wave and metocean data modelling and noise assessing, the two organizations have addressed difficulties to develop a competitive tool designed for shipowners (fishing, tourism, transport), Oil & Gas and MRE manufacturers who need to secure / size their infrastructure at sea but also insurance companies that define their policies according to the risks.

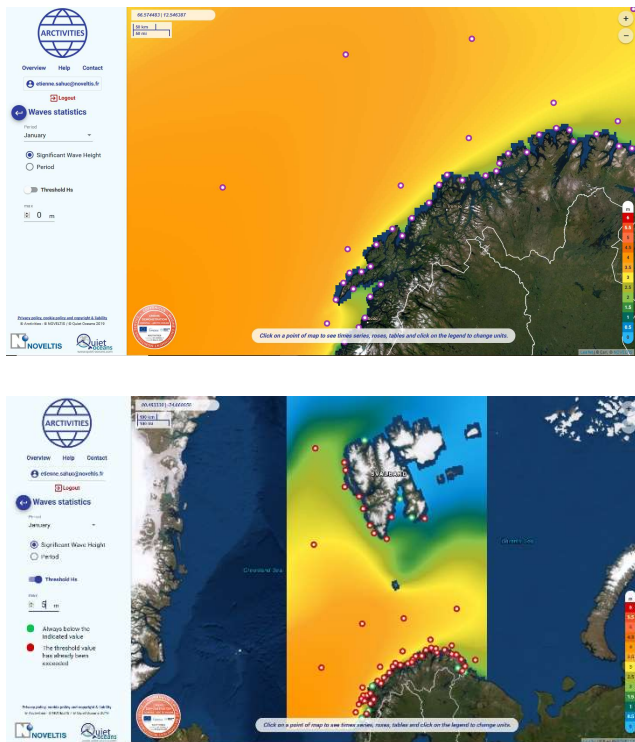


Figure 4 : Wave height displayed on the Arctivities interface

This service allows Arctic stakeholders to find all they need on the same platform gathering a lot of relevant indicators for their business according to their requirements.

Contact details:

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<https://www.noveltis.com/>

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