

Ocean of change: Predicting and Managing Harmful Algal Blooms Impacts in the Coastal Seas of Europe now and in the future

9th April 2021: Over the last three years, researchers from 12 institutes across seven European countries (Norway, Sweden, Germany, Ireland, France, Spain and Romania) investigated the impacts of ocean climate change on coastal marine ecosystems.

The researchers, with expertise in climate change, social science, economics, modelling, marine biology, chemistry and physics were partners in the CoCliME project. The central purpose of the CoCliME (Co-development of Climate Services for adaptation to changing Marine Ecosystems) project was to create climate adaptation services in partnership with representatives from marine related businesses, regional authorities and coastal communities who are directly impacted by Harmful Algal Bloom events. The harmful microscopic plankton, come in many shapes and sizes, and cause issues for shellfish harvesting, fish farming, fisheries, tourism and human health.

Dr Caroline Cusack of the Marine Institute said, “Ocean climate-driven changes in Harmful Algal Bloom (HAB) distributions and abundances will continue to directly impact marine related businesses and coastal communities. Working closely with those affected by blooms, the CoCliME partners tailored a number of useful services in the areas of decision support, training and outreach.”

CoCliME decision-support services

CoCliME economists developed a shellfish trade ban database in France with future government plans to extend it nationwide. The database is used to investigate shellfish production closures, and determine the potential economic impacts closures may have on the local shellfish industry. Harmful Algal Blooms represent 90% of motives for closing the farming zones. The effects can last over several weeks to several months and occur almost yearly with some shellfish areas impacted several times a year.

In 2019, after an exceptional harmful algal bloom that resulted in massive amount of farmed salmon mortalities in Norway, CoCliME researchers developed a new HAB monitoring programme with the Norwegian Food Safety Authority, the Norwegian Directorate of Fisheries, and mussel/fish farmers and together they are continuing the work to develop a ‘one-stop-shop’ website for the aquaculture industry.

In the Mediterranean, CoCliME researchers worked closely with water and health agency representatives to coordinate a monitoring programme to identify harmful *Ostreopsis* bloom events in summer as aerosolised chemicals from these blooms can cause mild respiratory irritations in beach users. Researchers connected to the Ramoge Agreement (France, Monaco and Italy) and from Spain participated in CoCliME and monitored increases of *Ostreopsis* blooms in the Mediterranean and Atlantic, which is helping public authorities and private stakeholders to better identify bloom impacts.

“It contributes to increasing awareness on climate ocean and human health. They shed light on influences of climate change on the development of HABs and the social and economic aspects as well as the health component that they induce in a coastal area such as the Mediterranean, which is particularly touristic,” said Anne Vissio, Secrétaire executive, Accord RAMOGE.

There are now plans to continue the coordination of a HAB alert service. In Sweden, ocean climate models developed in CoCliME provided useful information on what the future cyanobacteria bloom risks are as the climate changes.

“CoCliME gave me new insights into the harmfulness of different phytoplankton taxa and the forcing factors of bloom formation. The projected climate change effects on cyanobacteria

blooms in the Baltic Sea is useful information for me,” said Malin Persson of the Swedish National Food Agency.

CoCliME training courses

Other activities in the CoCliME project, led by German, Spanish and French researchers included training courses on novel molecular biology detection techniques, how to sample HABs that live on seaweed and statistical training courses focused on long time series analyses and model projections.

Dave Clarke, Shellfish Safety Manager at the Marine Institute Ireland, who attended one of CoCliME training workshops said, “Molecular methods offer reliable detection to enable industry and regulatory authorities to make informed risk management decisions. To have courses like this is extremely beneficial and valuable where laboratory personnel can be trained and learn new molecular techniques that assist in their daily statutory monitoring and research activities.”

“The hands on qPCR course allowed me to gain a comprehensive understanding of new tools for the detection of HAB species in Europe” said Laia Viure, who conducts monitoring of *Ostreopsis cf ovata* in the Catalan coast.

CoCliME Outreach

Today, scientists have an important role in translating technical scientific jargon into a language that users can understand. In the CoCliME project, many users requested accessible information on the impacts of climate change on the ocean and harmful algal blooms for a wide audience including policy makers, general public, local and regional authorities and medical professionals. With this in mind, CoCliME researchers developed infographics and illustrations to inform and build awareness on the importance of our ocean, the changes that are occurring and the potential impacts on ecosystems and human communities. Post project plans include the use of the graphics, translated into relevant languages, for use in brochures, websites, training courses and other publication materials.

David Mellett, Irish Climate Action Regional Office, Atlantic Seaboard North Coordinator stated, “Local authorities are on the front line of climate change and climate adaptation because the physical effects of climate change manifest locally through incidents of flooding, coastal erosion or other extreme weather events and our measure of climate risks needs to be understood in the context of geographically defined areas. All local authorities have adopted Climate Adaptation Strategies and are working towards adapting their functions and supporting communities build resilience and plan for the impacts of climate change. Coastal zones are especially in need of climate services for adaptation, as they are increasingly threatened by sea level rise and its impacts, such as submergence, flooding, shoreline erosion, salinization and wetland change. The climate services for adaptation to our changing marine ecosystems developed under the CoCliME project will help build awareness of the importance of our oceans, better understand the risks and opportunities for coastal communities and inform decision making into the future. The ocean climate infographics already developed under the project is a clear example of how scientific information can be communicated to a broad audience to help build awareness of the role of our oceans in regulating climate change and the increasing risks and opportunities to the cultural and economics of coastal communities.”

The CoCliME (Co-development of Climate Services for adaptation to changing Marine Ecosystems) Project, was coordinated by the Marine Institute and funded by the Irish Environmental Protection Agency (EPA), the European Commission and other European national funders.

This project is funded under the EPA Research Programme 2014-2020. The EPA Research Programme is a Government of Ireland initiative funded by the Department of the Environment,

Climate and Communications. It is administered by the Environmental Protection Agency, which has the statutory function of co-ordinating and promoting environmental research.

CoCliME partner Institutes:



CoCliME funders:



For more information, please contact:

Sheila Byrnes e. sheila.byrnes@marine.ie m. +353 (0)87 815 5271
Sinéad Coyne e. sinead.coyne@marine.ie m. +353 (0)87 947 7090

Editor's Notes:

Marine Institute

The Marine Institute is the state agency responsible for marine research, technology development and innovation in Ireland. It provides government, public agencies and the maritime industry with a range of scientific, advisory and economic development services that inform policy-making, regulation and the sustainable management and growth of Ireland's marine resources.

www.marine.ie

EPA Research Programme 2014–2020:

The EPA's current Research Programme 2014–2020 is built around three pillars - Sustainability, Climate and Water. More information about the EPA Research Programme can be found by visiting the EPA website where you can subscribe to the Research Newsletter. This provides news and updates about research calls, events and publications that are of relevance to researchers and other

interested parties. Follow EPA Research on Twitter @EPAResearchNews for the information and developments about the Research Programme and its projects.

CoCliME project:

Project CoCliME is part of ERA4CS, an ERA-NET initiated by JPI Climate, and funded by EPA (IE), ANR (FR), BMBF (DE), UEFISCDI (RO), RCN (NO) and FORMAS (SE), with co-funding by the European Union (Grant 690462). The EPA funding for the ERA-NET initiative falls under the EPA Research Programme 2014-2020, a Government of Ireland initiative funded by the Department of the Environment, Climate and Communications. It is administered by the Environmental Protection Agency, which has the statutory function of co-ordinating and promoting environmental research.

For more information on CoCliME, please visit: www.coclime.eu and follow @Co_CliME on Twitter.

Disclaimer:

Although every effort has been made to ensure the accuracy of the material contained in this press release, complete accuracy cannot be guaranteed. Neither the Marine Institute nor the authors accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting or refraining from acting, as a result of a matter contained in this press release.