



Research

Modelling of Ecological Risks Related to Sea-Dumped Chemical Weapons (MERCW)

The MERCW project focuses on the study of chemical munition dump sites in the Baltic Sea and Skagerrak area. Through focused site investigations an assessment will be made of the ecological risks related to the dumped warfare for the marine ecosystem and people.

Background

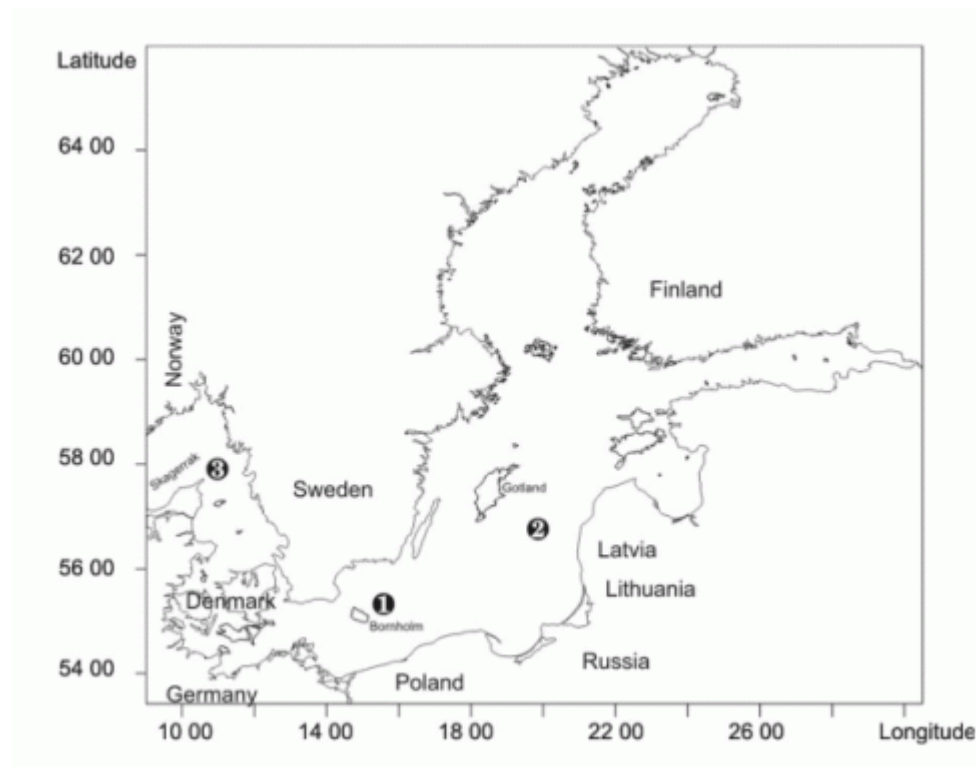
After World War II some 300,000 tons of Chemical weapons (CW) were captured. By far the largest part of these weapons was dumped in the Baltic Sea and Skagerrak Strait. In the Baltic Sea at least 50,000 tons of CWs were dumped. The largest dump site is located off Bornholm; other dump sites include the Little Belt and the Gotland Basin.



Objectives

The main objective of the MERCW project is to carry out focused research and technology developments on Dumped chemical munitions. Photo © SIO. Three dump sites in the Baltic Sea in order to model the transport pathways and migration spreading of toxic agents in marine sediments and the marine environment. The final goal is to assess the ecological safety for the ecosystem and people of the coastal states near the dump sites. The sites chosen for investigation feature a wide range of hydrographical and sedimentological controls and a diversity of dumping conditions in the Baltic Sea:

1. The Bornholm site is located in the western Baltic, east of the island of Bornholm. Over 35.000 tons were dumped in water depths ranging between 70 and 120 m. The CW contained an estimated 13.000 tons of toxic agents. Most CW was thrown over board packed in crates or containers, but some ships were also sunk.
2. The Gotland Deep site is located in the central Baltic. At least 2.000 tons of CW was dumped here (some sources mention a total of 40.000 tons). There are strong indications that part of the conventional and chemical munition was thrown overboard during transport to the Baltic dump sites; how many tons were thus dumped is not known. Most likely it is mainly this ammunition that has been washing ashore on the beaches of Denmark and Poland.
3. The Måseskär site is located in the eastern Skagerrak, 25 km off the Swedish coast. At least 8 ships were sunk here in a water depths ranging between 180-200 m. According to reports roughly 30.000 tons of toxic agents were dumped.



Map of the dumping areas.

Workplan

The project workplan involves the implementation of 8 linked workpackages and will (2) analyse existing data and integrated geophysical remote sensing investigations including seismics, magnetometry, side-scan sonar, electromagnetic and bathymetric measurements, and (3) acquire hydrographical, geo- and hydrochemical, and hydrobiological information around the dumpsites (seawater structure and motion, general properties of bottom sediments, presence of toxic compounds). The findings are analysed together with (4) 3D models of physical processes that control propagation of toxic compounds in the bottom sediments seawater system, and (5) a generic model for the trophic enrichment of toxins, to be developed in the project. The models will be applied separately and combined for scenario studies to estimate the risks of bioaccumulation of CW products in the food web.

The ecological risk value (ERV) of the modelled risks will be assessed (6) for marine ecosystems and people. Innovative visualisation, Virtual Reality technology and interactive data analysis will be applied (7). The resulting scenarios are crucial to support decision-making, risk analysis, and emergency plans. An indicator concept for use in decision-making based on the DPSIR-concept will be developed. A documented database will be constructed (8) and project results disseminated towards end-users and the public.

DPSIR is a framework which distinguished driving forces, pressures, states, impacts and responses (DPSIR framework) acting as an integrated approach for reporting, e.g. in the EEA's State of the Environment Reports. The framework is seen as giving a structure within which to present the indicators needed to enable feedback to policy makers on environmental quality and the resulting impact of the political choices made, or to be made in the future.

List of partners:

Finland	Finnish Institute of Marine Research	FIMR
Russia	Shirshov Institute of Oceanology - Atlantic Branch	SIO
	Saint-Petersburg Scientific Research Center of Ecological Safety	SRCES

	Scientific and Productin Association "Typhoon"	TYPH
Belgium	Renard Centre of Marine Geology, Universiteit Gent	RCMG
	G-Tec	GTEC
Germany	Rheinische Friedrich-Wilhelms-Universität Bonn	UBO
Latvia	University of Latvia	UL
Denmark	National Environmental Research Institute	NERI

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News

More information

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