

Press release**GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel****Ilka Thomsen**

03/21/2025

<http://idw-online.de/en/news849399>Research projects
Biology, Chemistry, Environment / ecology, Geosciences, Oceanology / climate
transregional, national**Managing Legacy Munitions in the Baltic Sea: Expedition AL628 investigates suspected sites in German and Danish waters**

21 March 2025/Kiel/Rønne. It is well known that the Baltic Sea is contaminated with remnants of munitions from past wars. However, many questions remain about the exact locations of these munitions and their condition after decades under water. Three major projects at national, Baltic Sea and European level are currently working to consolidate existing knowledge and develop technologies to safely identify submerged munitions. GEOMAR is contributing to these efforts with three Baltic Sea expeditions. The first mission has now begun: the research vessel ALKOR is testing and further developing state-of-the-art mapping and analysis techniques in German and Danish waters.

Today, they all go into the water: ALBERT, TIFFY, and KÄPT'N BLAUBÄR. The two autonomous underwater vehicles and the small blue remotely operated vehicle from GEOMAR are lowered into the sea to explore the waters south-west of Bornholm. This is no easy task in the strong winds that are almost a constant around the island in the middle of the Baltic Sea between Sweden, Denmark, Poland and Germany. Good conditions for wind energy, which is why Bornholm is set to become a hub for wind energy. The environmental impact assessments for planned offshore wind farms are currently underway. A key question in this process is: What role does marine munitions play in this, in particular the presence of chemical munitions? What measurements and data are needed to assess the risks and make informed decisions?

MUNI-RISK: Asking the right questions

Developing appropriate guidelines is one of the tasks of the MUNI-RISK project (Mitigation of Risks Due to Submerged Munitions for a Sustainable Development of the Baltic Sea). Since the end of last year, this EU-funded project, led by the University of Aarhus, has been bringing together experts from a variety of research fields to develop concrete tools and guidelines that will enable the Baltic Sea countries to better assess the risks posed by munitions.

The project is working closely with local authorities, environmental agencies, and experts from industry and business. This also applies to Bornholm, where local stakeholders met with researchers aboard the ALKOR on Tuesday, 18 March 2025. "We want to know what concerns people have about munitions in the sea. What questions do they think science should answer?" explains project leader Dr Hans Sanderson, an environmental and climate risk expert at Aarhus University. These questions are being asked not only on the Danish island, but also in Estonia and Poland, where wind farms are also planned and dumped munitions could pose a potential risk.

Underwater robots dive into the investigation

Expedition AL628 is the first of three missions to collect data for three major munitions projects: CONMAR, which investigates munitions management in German waters; MUNI-RISK, which focuses on the entire Baltic Sea; and MMinE-SwEEPER, a nine-country European research effort. In addition to scientific and technological objectives —

such as assessing munitions contamination and improving autonomous mapping and analysis methods — the expedition also promotes international cooperation.

“We rely on the exchange of knowledge and data,” says chief scientist Prof. Dr Jens Greinert, marine geologist and munitions expert at GEOMAR. “Where could old munitions be located?” Looking out over the vast ocean around the ship, the challenge is evident: where to start searching? Even when there are clues, the search remains complex and often time-consuming.

For the area south-west of Bornholm, there were such indications. Jens Greinert explains: “On the other side of the island, chemical munitions were dumped in 1947, and this area here is classified as a relocation area. In the past, when fishermen found remnants of chemical warfare agents in their catch, they were instructed to dispose of them here”.

Seeing through the eye of KÄPT’N BLAUBÄR

While ALBERT and TIFFY scan the seabed in the area, KÄPT’N BLAUBÄR’s camera allows the research team to monitor the conditions in real time: lots of rocks, some covered in marine growth, but no sign of chemical munitions. Chemical analysis of water samples taken at the same time shows no evidence of explosives. “That is good news,” summarises Greinert.

Next, ALKOR will head to munitions dumping sites in the Bay of Lübeck, where researchers from the Polish institute IOPAN and the German Federal Police will join the expedition. The final destination will be off the coast of Boltenhagen, where a barge loaded with conventional munitions was sunk after the Second World War. The contents of the barge, which is lying on the seabed, will be cleared by an explosive ordnance disposal company from Rostock in June and July.

The next expedition is planned for October 2025 and will focus on investigating chemical munitions in Polish waters.

About: Unexploded Ordnance in the Baltic Sea

An estimated 40,000 tonnes of chemical munitions from World War II, along with over one million tonnes of unexploded ordnance (UXO), lie submerged in the Baltic Sea. Containing hazardous substances like mustard gas and arsenic compounds, often in corroding containers, these munitions pose serious risks to marine ecosystems, human health, and industries such as fishing and offshore wind energy. Researching these legacy munitions is a complex challenge, beginning with the mapping of munitions dumping sites and former battle zones. Reliable technologies are still lacking for the automated detection of hazardous objects and for accurately assessing their risk potential. The expeditions with the research vessel ALKOR aim to gather data to further develop such technologies, improve understanding of the environmental impacts of munitions contamination in the Baltic Sea, and ultimately contribute to long-term solutions for safe handling.

About: MUNI-RISK

MUNI-RISK, or Mitigation of Risks Due to Submerged Munitions for a Sustainable Development of the Baltic Sea, is an EU-funded project dedicated to addressing the risks posed by old munitions on the seafloor of the Baltic Sea. These remnants of past conflicts, including World War II, can pose serious environmental and safety hazards. The project aims to identify the most critical areas for remediation and improve risk assessments, especially in locations where new infrastructure, such as offshore wind farms, is planned. By compiling and analysing data from Baltic Sea countries, MUNI-RISK will help fill knowledge gaps, promote a science-based approach to managing underwater munitions, and support public and private entities in incorporating munitions risks into environmental impact assessments. The project’s findings will be shared with national and international stakeholders, ensuring that the methods developed can also be applied to other regions, such as the Black Sea.

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