

Dumped Munitions in the Baltic

Friday, 13 September 2019 10:00 (25 minutes)

Chemical and conventional ammunition dumped in the Baltic Sea and the Skagerrak contain a wide range of hazardous substances. Considering the growing use of the seabed for economic purposes (offshore wind farms, pipelines etc.), the likelihood of disturbing dumped containers with chemical warfare agents, causing direct emissions to the surrounding environment and risk of human and wildlife exposure, is increasing. In addition, the containers are deteriorating due to e.g. corrosion. For all these reasons there is an ongoing discussion on how to assess and manage the environmental risk of dumped ammunition, especially in areas where their location is likely to cause a conflict with maritime activities.

DAIMON aims to increase the knowledge base on how to evaluate the risks and benefits of various management options.

DAIMON has performed several studies in both conventional and chemical munition dumpsites. These studies included different risk factors, such as density of munitions on seabed, their corrosion status and pollution of nearby sediments. New approaches for analysis of both CWAs and toxic explosive related chemicals on a one method using sophisticated high resolution mass spectrometry have been tested and applied in pilot studies. Further experiments were carried out to confirm the structure of newly discovered CWAs using liquid chromatography, NMR and LC-MS. Two analyte structures were confirmed. Further work to identify the remaining three novel chemicals is underway. One of these may be significant due to relatively high concentrations in some studied sediment samples.

Also currents and leakage rate were estimated, and probability of pollution modelled. This data sets were complemented by studies of biota – biomarkers of environmental stress, bioaccumulation of toxic agents and their toxicity. Preliminary chemical data indicate exposure of fish in the dumpsite to chemical warfare agents. Studies in a dumpsite of conventional munitions in Kiel Bight reveal an elevated prevalence of neoplastic lesions (liver tumours and pre-stages) in flatfish (dab, *Limanda limanda*) from the area

In DAIMON a special neural net structure is used to constitute the decision support module based on above-mentioned data. It forms a categorisation algorithm which enables one hand side an on-line categorisation of selected places, regions or special environmental situations, otherwise elaborate a short and long time prognosis. This enables an adaptive system for different players like administrations, offices or users can be supported by client specific situation reports.

Collaboration

Primary author: BELDOWSKI, Jacek (Instytut Oceanologii PAN)

Co-authors: VANNINEN, Paula (VERIFIN); LANG, Thomas (von Thuenen Institute of Ecology)

Presenter: BELDOWSKI, Jacek (Instytut Oceanologii PAN)

Session Classification: Neutrons in Homeland Security