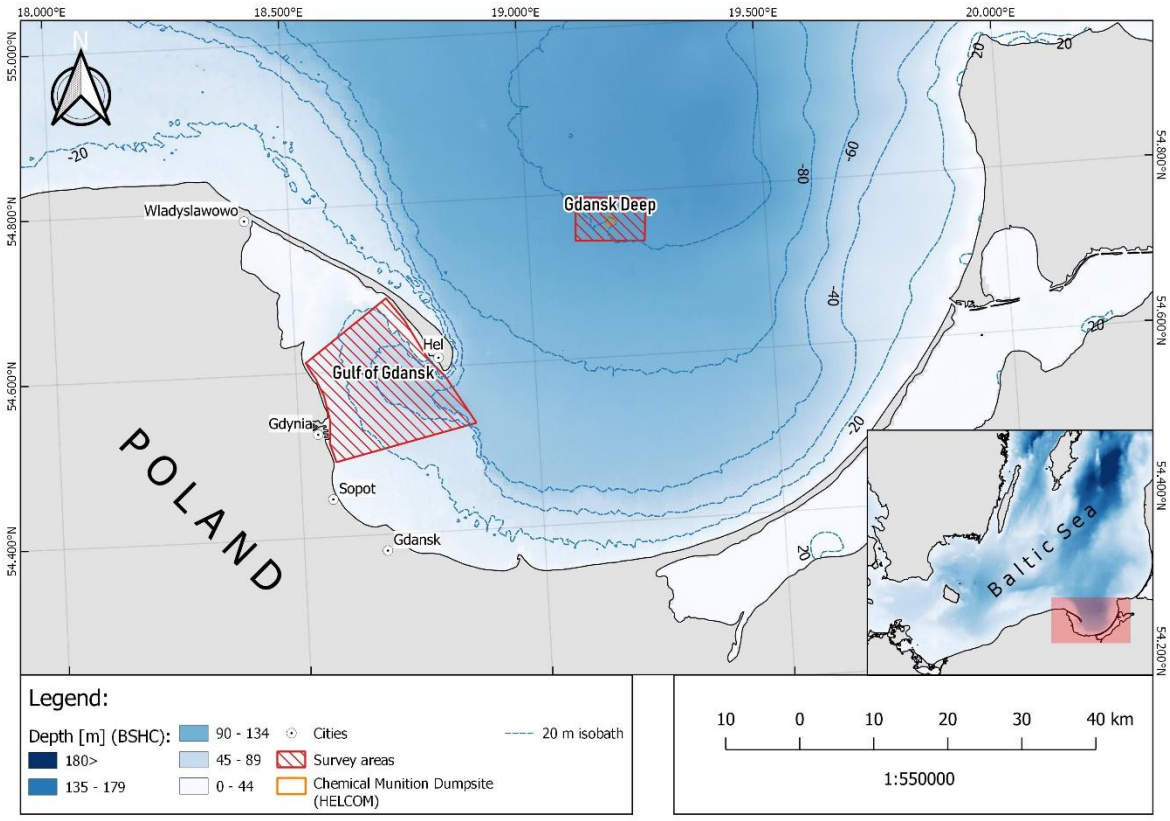
Report Training cruise on s/y Oceania.

Participants were trained according to the agenda presented in cruise note. It included several aspects of the Ecotox Toolbox and DSS.

Regarding Ecotox Toolbox, the approach of preliminary and detailed investigation were introduced and explained.

Two training localisations were selected in the regions where earlier data showed the presence of the chemical weapons degradation products in environmental samples.



ECOTOX toolbox and related DAIMON2 Recommended and Standard operation procedures were utilised, according to the structure:

1. Methods for munitions detection' and identification
2. Chemical methods for detecting warfare agents (parent compounds and degradation products) in water, sediments and biota

3. Biological methods for detecting effects of toxic warfare agents from chemical and conventional munitions in marine organisms (vertebrates, invertebrates)
4. Guidelines for additional measurements e.g. addressing habitat condition
5. Guidelines for data analysis and assessment

For munition detection and identification participants were actively involved in acoustic survey of the area, using AUV (Autonomous Underwater Vehicle), and identification using ROV (Remotely Operated Vehicle). This corresponds to factsheets 1.1-1.2 of the toolbox.

Regarding methods for methods related to detection of warfare agents, participants assisted in multiple sampling activities, corresponding to ROPs 1-3. Training in safety procedures was performed, according to SOPs 4 and 5.

Due to limited ability to sample fish, bioassays were limited to mussel sampling (SOP 15), Chemical analysis, due to field conditions was limited to demonstration of ROP 30,

Remaining SOPs and ROPs were discussed during lectures performed during the cruise. Also, environmental parameters (temperature, salinity, oxygen, redox, pH) and metals (X-ray fluorescence) analysis was demonstrated, with hands-on experience.

Guidelines for additional measurements and data analysis and assessment were discussed during lectures and workshops, where also application of DSS was demonstrated. Participant were able to perform DSS analysis on the data collected during the cruise.

OC_OCT20 cruise report

During the cruise, training for project users was carried out. This included AUV mission design, AUV launch, and sonar data interpretation; Carrying out the ROV mission, collecting water, bottom sediment and benthic organisms. Participants of the training were also trained in STD, TXRF measurements and meiofauna analyzes. The participants of the cruise on behalf of the Naval Academy demonstrated chemical protection methods. During the cruise, tests were carried out on five points located in the Gdańsk Deep (GD_OC_OCT20_1, GD_OC_OCT20_2) and in the Puck Bay (GG_OC_OCT20_1, OX_OC_OCT20_1 and OX_OC_OCT20_2) (Fig. 1). Measurement missions were carried out in all locations using the AUV underwater robot with a side sonar and a towed magnetometer (Tab. 1). On the basis of the collected data, the areas to be tested with a remotely controlled ROV were designated at all points. While observing the seabed, boulders and several small anthropogenic objects were detected at points GD_OC_OCT20_1 and GD_OC_OCT20_2, while a torpedo from World War I was detected in the regions of OX_OC_OCT20_1 and OX_OC_OCT20_2. In the vicinity of the GG_OC_OCT20_1 area, a mine barge wreck resting on the bottom has been observed.

Table 1. Details of the AUV autonomous underwater vehicle mission

Area	Mission name	AUV mission vertex coordinates	The date and time of the start and end of the AUV mission
Głębia Gdańsk	GD_OC_OCT20_1	54.7613416 N; 19.1647251 E 54.7607515 N; 19.1589667 E 54.7628747 N; 19.1583193 E 54.7634648 N; 19.1640777 E	Start: 01.10.2020 – 19:45 End: 01.10.2020 – 22:10
Głębia Gdańsk	GD_OC_OCT20_2	54.7591457 N; 19.1659551 E 54.7604276 N; 19.1598716 E 54.7621159 N; 19.1609343 E 54.7608340 N; 19.1670177 E	Start: 05.10.2020 – 09:45 End: 05.10.2020– 12:07
Zatoka Pucka	GG_OC_OCT20_1	54.7005055 N; 18.6119020 E 54.6969072 N; 18.6056751 E 54.6951255 N; 18.6087404 E 54.6987237 N; 18.6149675 E	Start: 03.10.2020 – 18:33 End: 03.10.2020 – 20:58
Zatoka Pucka	OX_OC_OCT20_1	54.5999843 N; 18.5647113 E 54.5974365 N; 18.5564923 E 54.5952177 N; 18.5585327 E 54.5977654 N; 18.5667518 E	Start: 02.10.2020 – 18:44 End: 02.10.2020 – 20:32
Zatoka Pucka	OX_OC_OCT20_2	54.5961717 N; 18.5603733 E 54.5919589 N; 18.5555900 E 54.5902898 N; 18.5599486 E 54.5945026 N; 18.5647323 E	Start: 06.10.2020 – 09:16 End: 06.10.2020 – 11:32

At the point near the Gdańsk Deep, water was collected for mercury concentration tests using Go_FLO bathometers on a Kevlar rope and Niskin on a steel rope (Tab. 2). At the same station, bottom sediments were also collected with the GEMAX probe. The sediments were partially analyzed for elemental composition using the TXRF method. In the area of Zatoka Pucka, bottom sediments were collected using a VanVeen scoop. Benthic organisms were collected by means of a drug.

Table 2. Details of chemical stations

station name	date	Time	wsp	Tools
GD_OC_OCT20_1	01.10.2020	UTC 7:36	54 45.492' N 19 09.817' E	STD, batometr czysty, GMEAX, VAN VEEN, AUV, ROV
GB_OC_OCT20_1	02-03.10.2020	UTC 7:45	54 35.725'N 18 33.525'E	STD, batometr czysty, GMEAX, VAN VEEN, AUV, ROV , draga
GD_OC_OCT20_1	04.10.2020	UTC 7:36	54 45.509' N 19 09.814' E	STD, batometr czysty, GMEAX, VAN VEEN, AUV, ROV
GB_OC_OCT20_2	05-06.10.2020	UTC 7:45	54 35.756'N 18 33.513'E	STD, batometr czysty, GMEAX, VAN VEEN, AUV, ROV , draga

Responsibilities:
Jacek Bełdowski - coordination of chemical tests, AUV service, collection of sediments and water, assistance in ROV measurements. Conducting general training
Miłosz Grabowski - AUV Service, ROV Service, Subbottom Profiler Service, Sediment Potential Measurement Experiment, AUV Training, Sonar Training
Marta Szubska - help in AUV measurements, collecting water and sediment samples, TXRF measurements, TXRF training
Grzegorz Siedlewicz - collection of sediments, water and pore waters, collection and identification of organisms, Training of sediments and benthos
Michał Czub - collection of meiofauna and macrozoobenthos, training in toxicology and meiofauna analysis.

DSS Training:

During the cruises a survey was played through where each individual aspect of detection, sampling, safety procedures and documentation was played through. This included AUV and ROV inspections, sediment and water sampling and the use of protective gear and safety precautions. After the cruises the participants were introduced to the DAIMON Decision Support System for Marine Munitions. The found information was entered and the different analysis were played through step by step, preparing the participant for a complete work through, from detection to analysis and Decision Support.

Outcomes:

- Two newspaper articles authored by Olivia Kortas came out in Austrian “Der Standard” and Dutch “De Groene Amsterdammer”. Both are also available as on-line versions:

  https://www.derstandard.at/story/2000124264740/spaete-suche-nach-den-giftwaffen-der-nazis

  https://www.groene.nl/artikel/nauwelijks-een-spoor-van-leven?fbclid=IwAR0YZlvv-0wWJnyu83GX12U8tgfw0YC7wdUVRZSd7i27nVmnq6FmEvbXbzE

- Polish science communicator – Dawid Myśliwiec from “Uwaga Naukowy Bełkot” YouTube channel prepared a detailed video about chemical weapon dumping at sea and the DAIMON project, however the material was not released yet due to ongoing additional filmmaking in laboratories with the representatives of Military University of Technology in Warsaw.

- Journalists from Belarus – Agne Dovydaityte and Alexander Belinski – were proceeding with a documentary movie, however the outcome is not ready yet.

- The process of data acquisition and munition dumpsites monitoring was introduced to the representative of Supreme Chamber of Control of the Republic of Poland – authority organ responsible for evaluation of actions taken to prevent the threat from dumped chemical munition to the environment by polish government. The Supreme Chamber of Control report from February 2020 indicated that Polish Government (including Ministry of Climate and Environment, Ministry of Maritime Affairs and Inland Navigation) did not take proper preventive and intervention actions in this manner. The Supreme Chamber of Control of the Republic of Poland continues the activities.