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Estimation of the risk of potential leakage from chemical munition dumped in the Baltic Sea

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It is a well-known fact that after Second World War (WWII) Allies decided to dump residual chemical munition into the sea. The main part was dropped into selected areas of the Baltic Sea and into Skagerrak (the precise dumping areas are not known, but based on the past investigations and information it is possible to select some main regions of dumping: Skagerrak, Bornholm Deep, Gdansk Bay and Gotland Basin). The exact total amount of dumped munitions is not known. The estimation varies between 60,000 and 200,000 tons. Currently, over 70 years after WWII there is no disposition from headquarters what to do, if somebody finds residues of chemical munition. There are no directives from the Helcom Commission and from the governments of the Baltic Sea countries in case of potential leakage. In our study we have implemented a passive tracer into hydrodynamic model that is a part of coupled ice-ocean model of the Baltic Sea (of ca. 2.3 km horizontal resolution and 5 meters vertical, Jakacki et al., 2017). Then, based on the results from the hydrodynamic part of coupled model, static downscaling of the bottom currents have been performed. Next the downscaled currents were used in high resolution (about 50 meters horizontal resolution) model for estimating the spread of potential leakage. The simulations have been performed for all of the most important dumpsites. Finally, analysis of many simulations for the same location provides probability of contamination and in consequence the risk assessment area could be estimated.

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