AANDERAA NEWSFLASH

Monitoring at World War II chemical munitions dump sites: trawling, sediment re-suspension and arsenic spreading

The Baltic Sea region contains a dark legacy of about 100 000 tons of dumped chemical warfare agents. As time passes the gun shells corrode and the risks of release of environmental toxins increases.

A major goal of the EU-flagship project Daimon is to support governmental organisations with case-to-case adapted methods for sustainable management of dumped toxic munitions.

At the Chalmers University of Technology, a partner of Daimon, a unique ISO 31000 based method was developed to provide decision support regarding potentially oil-polluting shipwrecks. The method is called VRAKA and is based on probability calculations. It includes site-specific information as well as expert knowledge. The VRAKA work was presented during a public PhD thesis defence on November 11, 2016. VRAKA and other methods will be adapted for dumped munitions in the Daimon project.

To estimate corrosion potential of gun shells and ship wrecks along with sediment re-suspension and transport at the dump sites multi-parameter instruments are deployed at dump sites (see figure 1). Parameters measured include Currents, Salinity, Temperature, Oxygen, Depth, Waves and Suspended particles.

One mooring was deployed in the middle of the Maseskar chemical munitions dumpsite off the West Coast of Sweden. The intention was to leave the instrument on the bottom for about 6 months but after 3 weeks it was trawled up and returned.

Fig1: Two instrument moorings prepared for deployment. Ballast weight at bottom, chain, acoustic release (thin grey cylinder), instrument, and two floats (white & orange) with lines.

The recorded data gave evidence of frequent trawling right through the dumpsite with important sediment re-suspension as a result (see figure 2 below). Sediment re-suspension can reach up to 40m above bottom.

Surveys in the area from 1992 by the Geological Survey of Sweden have shown very elevated arsenic concentrations downstream of the dumpsite. The dominant current direction in the lower 50m is northeast and arsenic is an important constituent of the dumped mustard gas.

It is likely that trawling contributes greatly to the spreading of arsenic. Still, it is not prohibited to trawl. The effects on ecosystems and human health, if consuming seafood, make the suitability of trawling at dumpsites questionable.

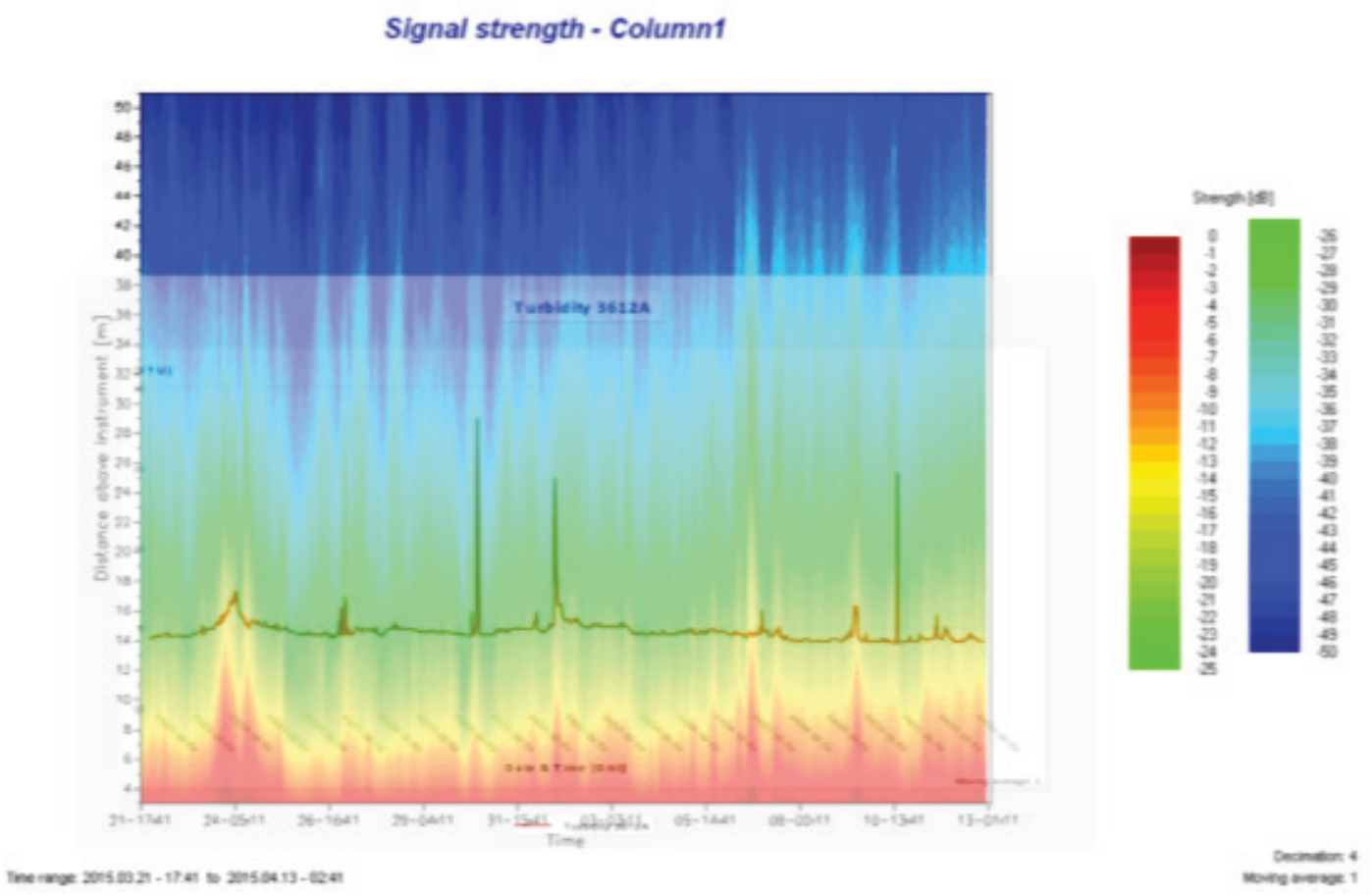

Fig 2: Overlay plot of turbidity measured about 1.5m above bottom (black line) and acoustic backscatter from the bottom up to 50m above (colour plot) from the Måseskär dumpsite. The occasional peaks in turbidity and backscatter correlate with each other and are all related to identified trawlers that fish in the area. No events of natural re-suspension due to high currents were detected.

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