

Opticap, thin layer capping of sediments using reactive and non-reactive materials, field studies

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In this research, innovative remediation techniques are used in pilot trials in the field. The ultimate goal of the research is to develop techniques for remediation of large sediment areas (over 1 km²). The technique is capping with thin layers of active and non-active materials, including activated carbon that binds organic contaminants so strongly that they cannot be taken up in organisms or transported to other environmental compartments. Other tested materials are suspended calcite from paper production, gypsum from sulfuric acid neutralization, hyperite, and natural clay.

The advantages of thin capping over many other remediation methods include i) it can be used as an in situ risk reduction method, ii) the price is low (1-2 euro per m²), and iii) it overcomes significant controversies associated with disposal of dredged and excavated materials.

With regard to AC amendment, we earlier showed the effectiveness of AC amendment in the laboratory. In the laboratory it was shown that AC amendments of 2 wt-% reduced freely dissolved porewater concentrations by a factor of 10-50; reductions of uptake in organisms were around a factor of 5. This presentation will describe field trials in Trondheim Harbour (sediment). In 50 x 50 pilot field plots, AC was applied on a harbour sediment in Trondheim. Methods were developed/applied for placement of the AC, physical monitoring (distribution of AC in the sediment), chemical monitoring (porewater concentrations and diffusion from the sediment) and biological monitoring (biodiversity and bioaccumulation). The developed methods will be presented, as will be the results of the pilot study.