Lift up of lowlands, looking at the reuse of sediments on peat meadows by looking at the physical, chemical and biochemical properties

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Introduction: Lift up of lowlands makes use of a millennium year old technique of reapplying sediment on land. However, over the last few centuries people have focussed on building dykes to protect the land from flooding, limiting natural accumulation of sediments, Secondly, groundwater management to allow agricultural use of the low-lying polder areas, causes subsidence of these areas, due consolidation and oxidation of organic fraction materials. At the same time many sediments have been contaminated by humans in a relatively brief period and in an even briefer period we have been able to detect those contaminants and form an opinion about their impact on the human health and the environment. Lift up of lowlands goes back to the roots, reapplication of dredged sediments to compensate subsidence and to improve the lands fertility, but takes into account the presence and potential impact of those sediments. Even more interesting is the location of the project, a peat area in a nature conservation area

Methods: In our research we focus on the physical behaviour of dredged sediment when applied on peat rich lowland. The extra weight of the sediment might cause further subsidence of the land.

Fig. 1: Sample taking of peat meadow

Another aspect is the dewatering speed and the physical properties of the dredged material, which lead to drying cracks which impact both the consolidation rate and the geochemistry of the pore water.

Fig. 2: Crack formation

We developed a new probe based on optical fibre measurements to follow the consolidation by measuring the density change over time on location.

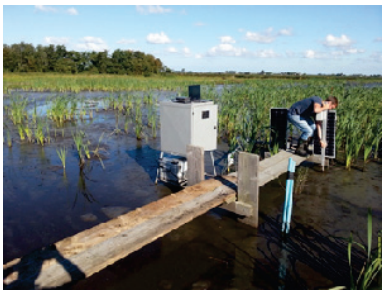

Fig. 3: Optical fibre measurements

In the lab we studied the flocculation and consolidation properties with a new type of zeta potential measuring device (optical particle tracking in an electric field).

And to ensure that the sediment would not cause an unacceptable ecotoxicological impacts we conducted leaching tests, passive sampling tests and ecotoxicological exposure calculations

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