

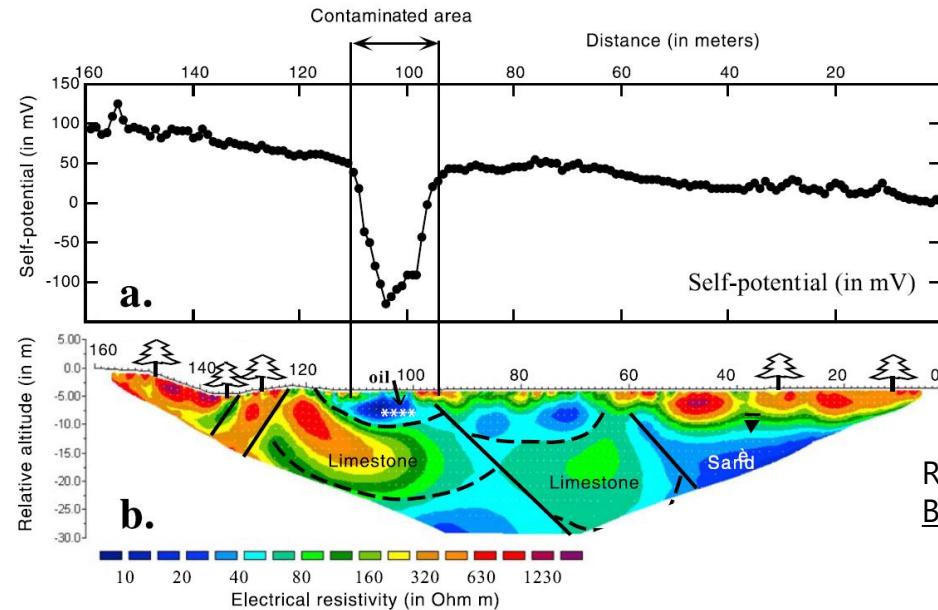


Måling af elektriske potentialer på jordoverfladen som metode til at lokalisere underjordisk forurening – BIOMAP

Lars Damgaard, forsker v Biologisk Institut, Aarhus Universitet

BIOMAPs teknisk/videnskabelige grundlag:

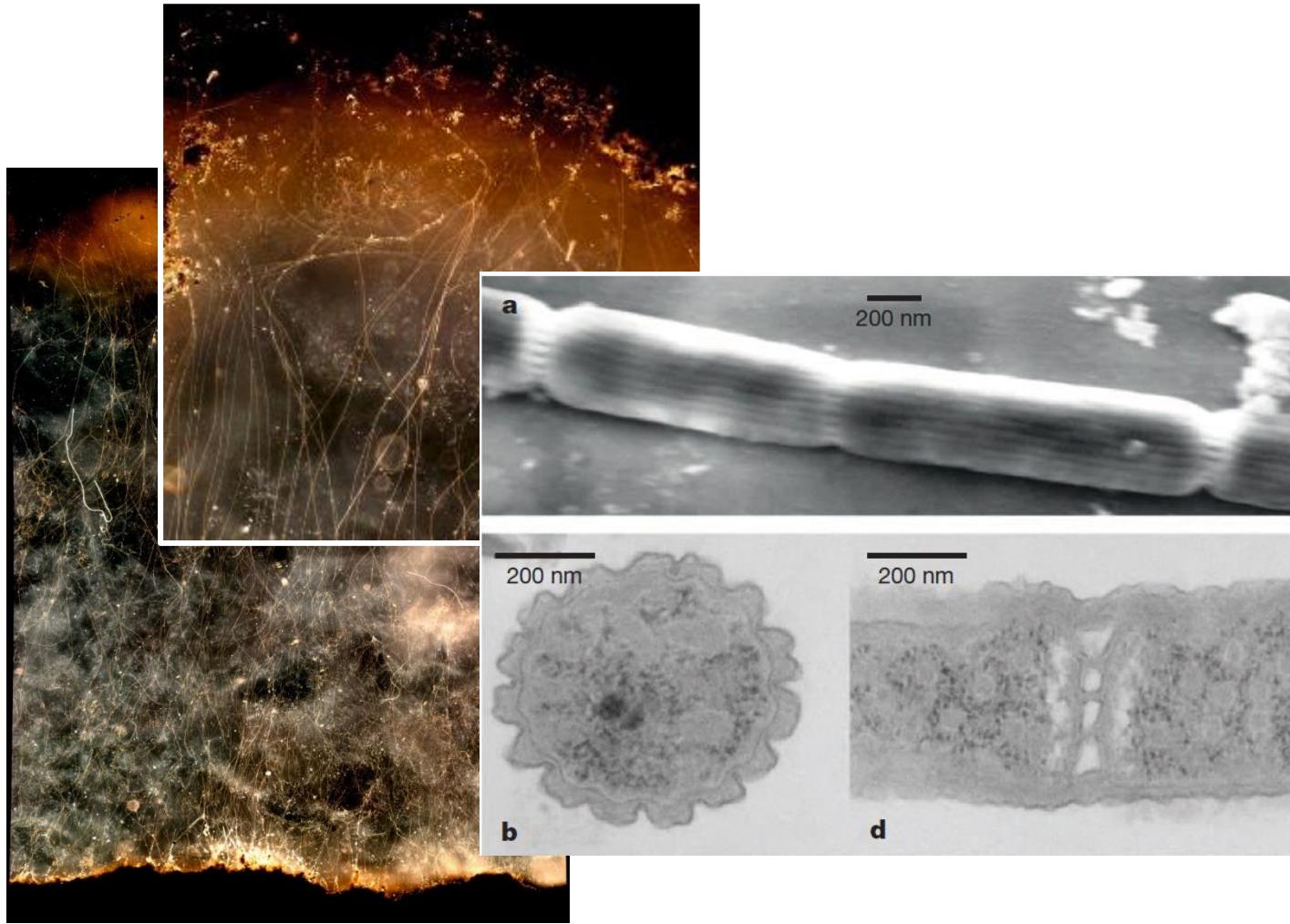
1. Observationer af anomalier i elektrisk potentielle (EP) over forurenninger



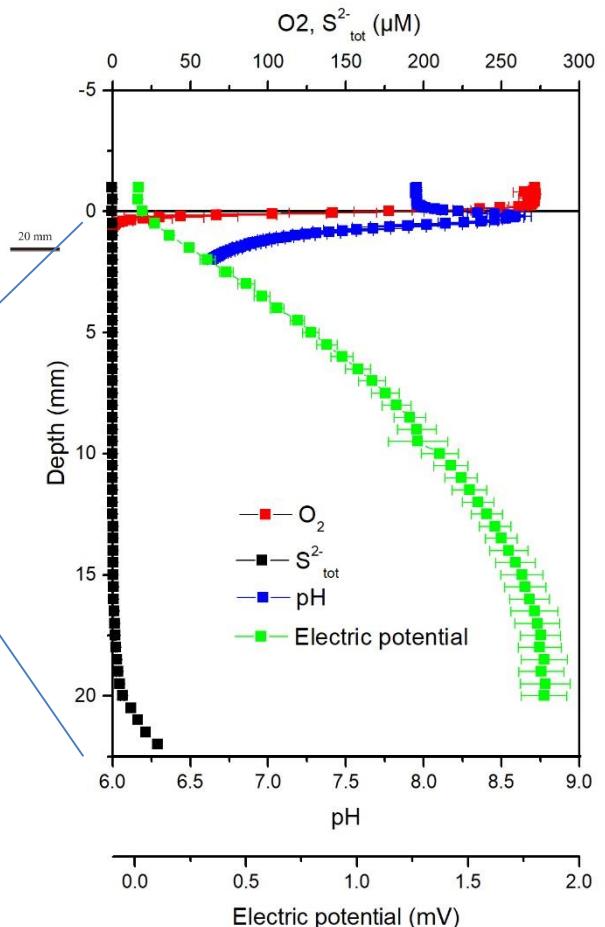
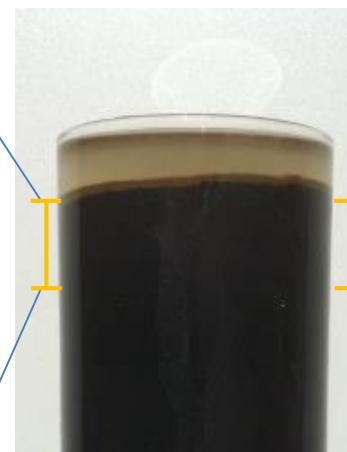
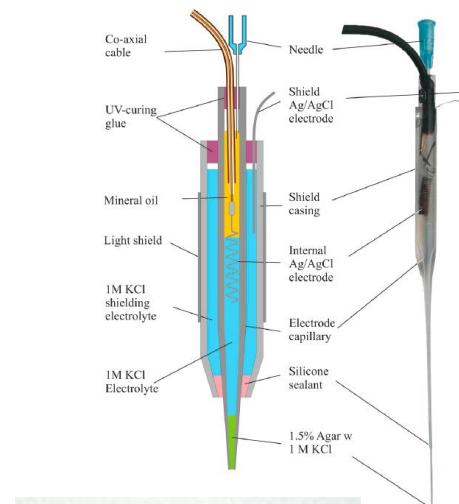
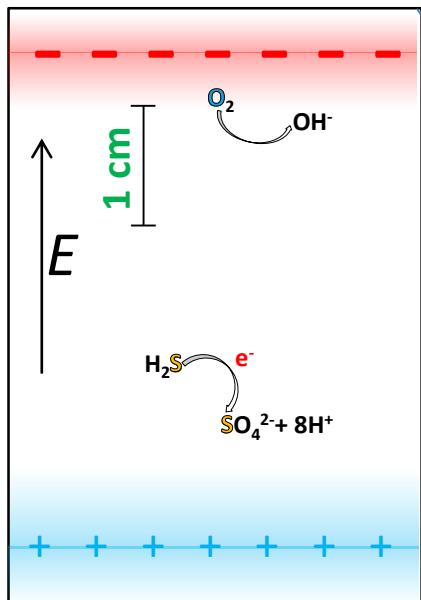
Revil, A., et al. (2010). *J. Geophys. Res.-Biogeosciences* **115: G00G02**.

2. Opdagelsen af kabelbakterier

Kabelbakterier



Kabelbakterier

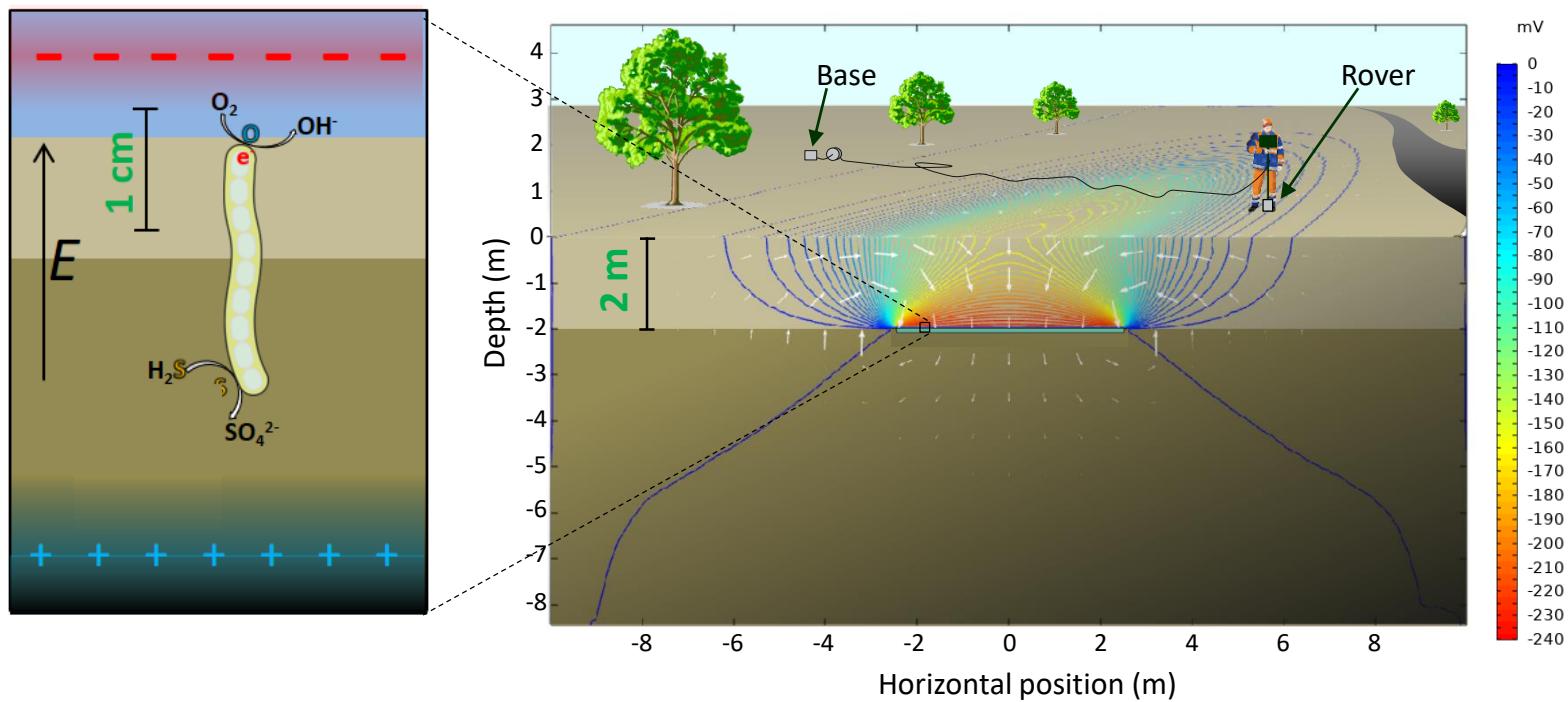




- Etableres kabelbakterier naturligt ved jordforureninger?
- Kan forurening i så fald lokaliseres gennem det elektriske potentiiale de genererer?

BIOMAP

= Micro**BIO**logically assisted **MA**pping of soil **P**ollution





BIOMAP - MicroBIOlogically assisted MApping of soil Pollution

Innovationsfonden, “Grand Solutions”.

Varighed 3 år, 16.5 mio. DKK.

The Innovationsfonden logo features the word "Innovationsfonden" in a dark blue, sans-serif font. To the left of the text is a teal-colored graphic element resembling a stylized flame or a series of diagonal lines pointing upwards.

Konsortium:



INSTITUT FOR BIOSCIENCE
AARHUS UNIVERSITET



CEM CENTER FOR
ELECTROMICROBIOLOGY

AU Biology: Lars R. Damgaard, Lars Peter Nielsen, Andreas Schramm,
Nicola Camillini, Lis Allaart



INSTITUT FOR GEOSCIENCE
AARHUS UNIVERSITET

AU Geoscience: Anders Vest Christiansen, Line Melgaard Madsen,
Akanksha Upadhyay



DMR A/S: Per Loll, Leder af Forskning og Udvikling

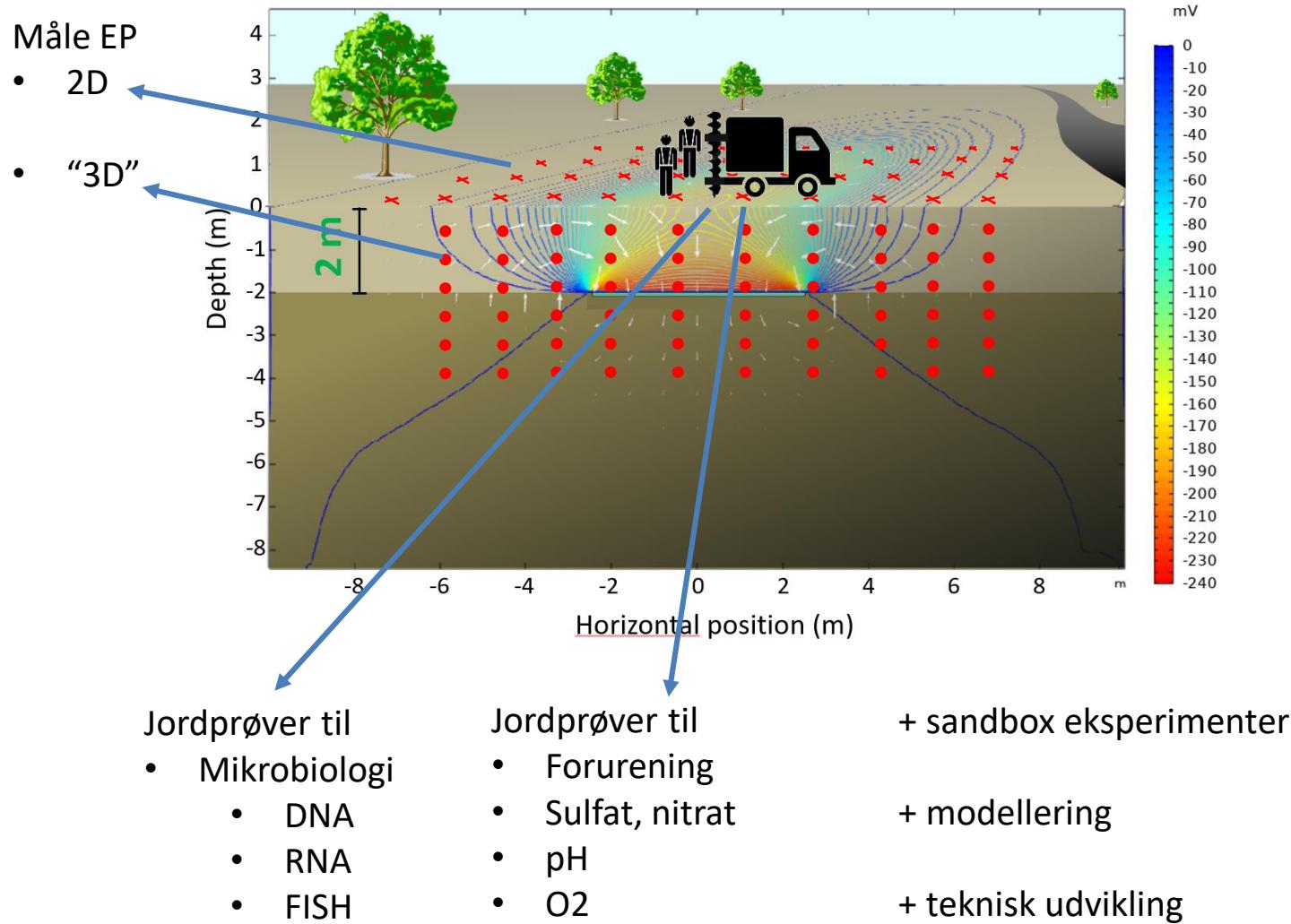


Region Midtjylland: Jesper Simensen, Chefkonsulent



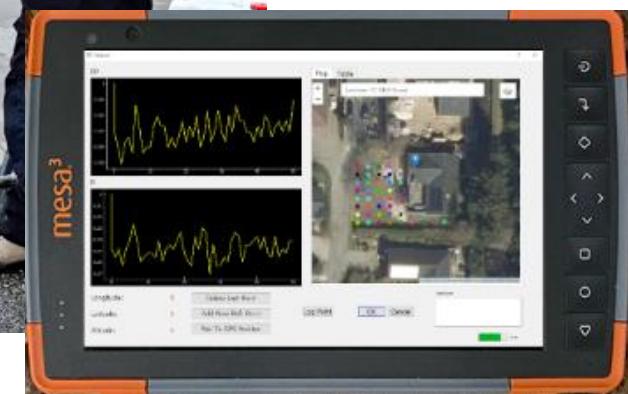
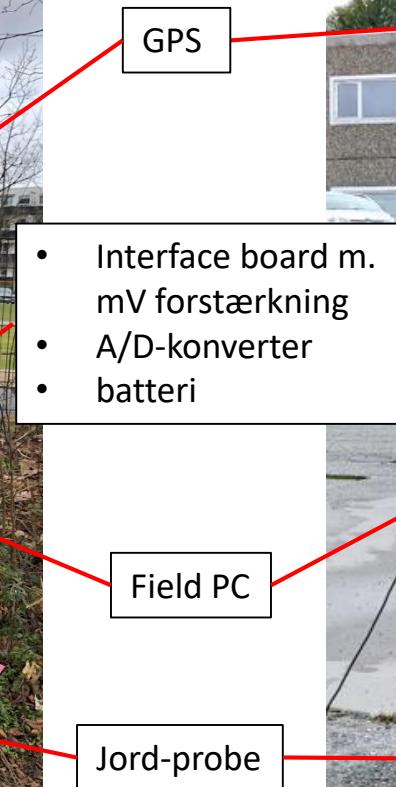
Region Hovedstaden: Niels Døssing Overheu, Specialconsulent

Strategi: detaljeret analyse af mange udvalgte sites.



Teknisk udvikling

Integreret 2D EP instrument

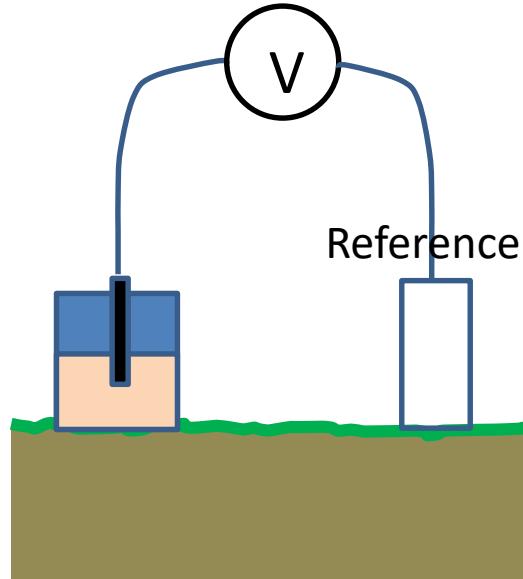


Teknisk udvikling

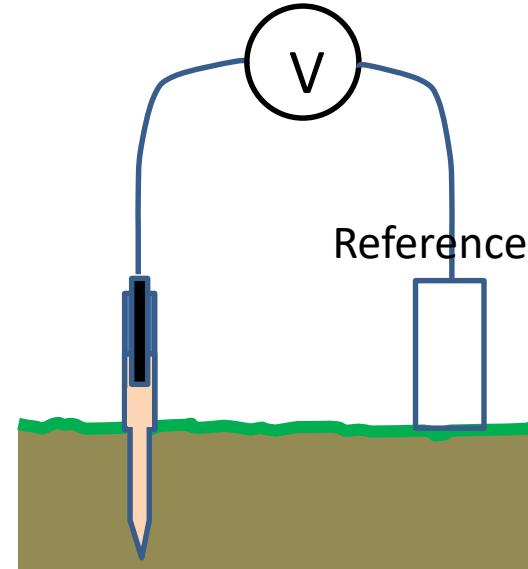
2D-prober



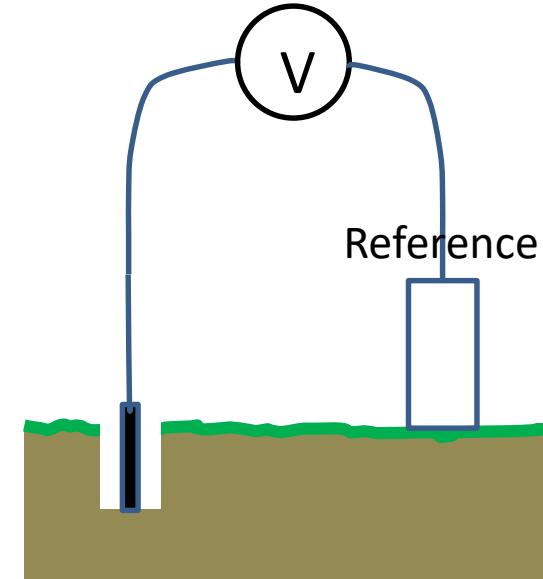
Spande-interface

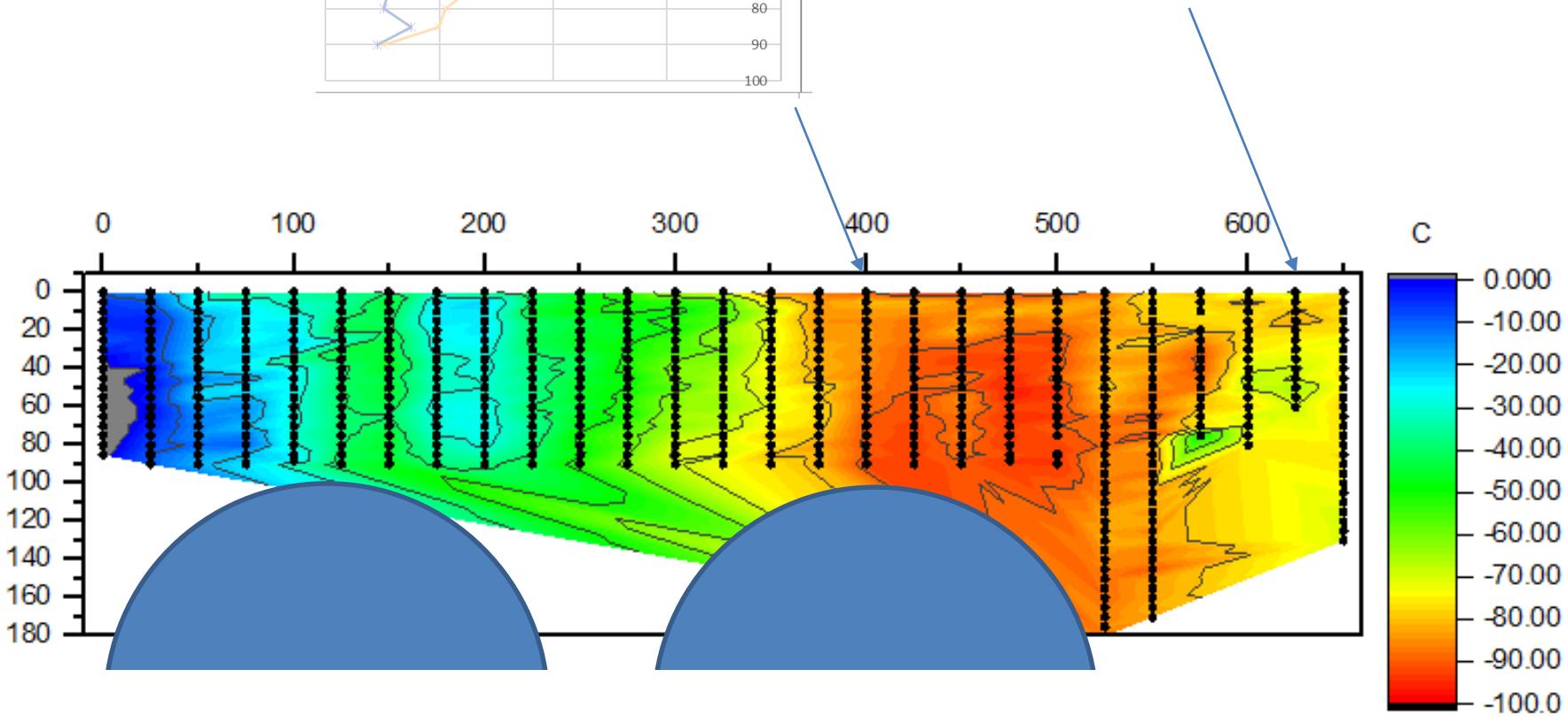
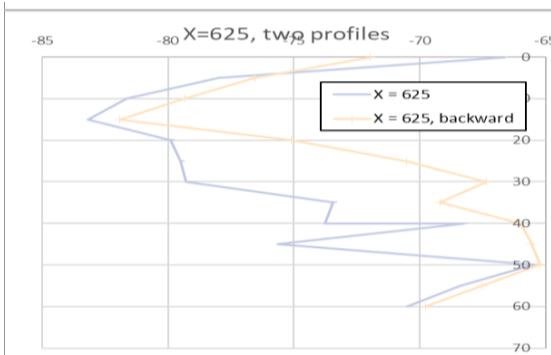
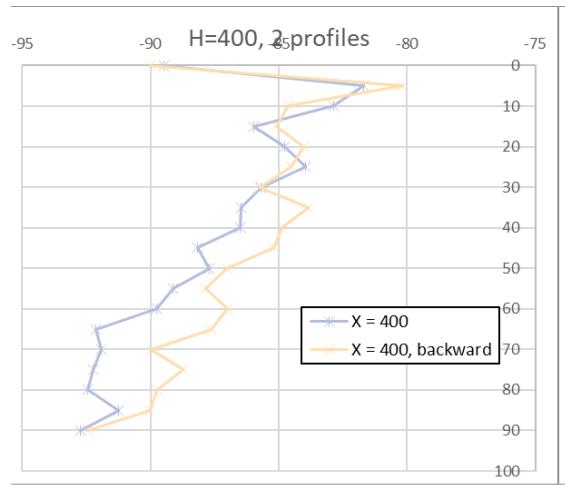


Spyd-interface



Nedgravning





Teknisk udvikling

Probe

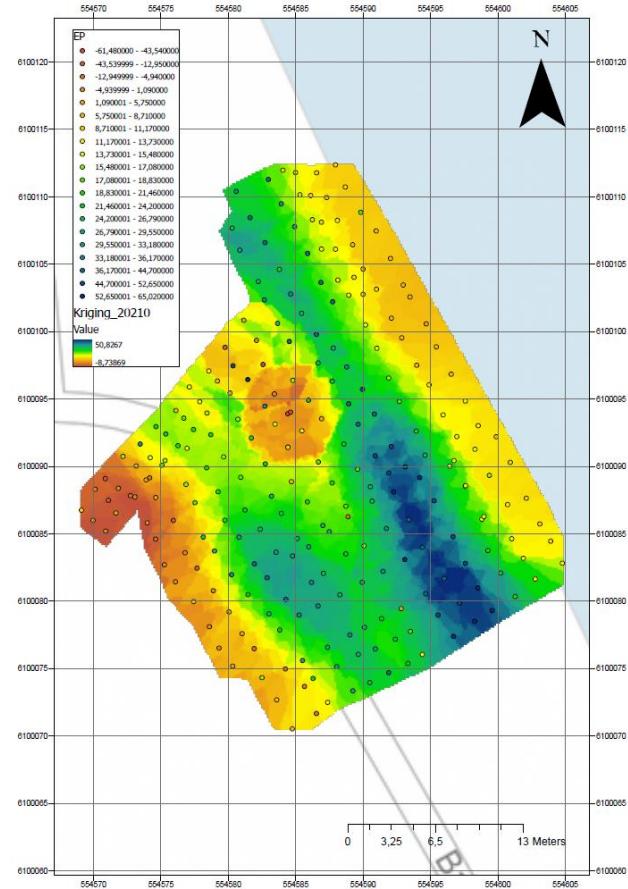




Felldata

Himmark Strand, Juni 2021

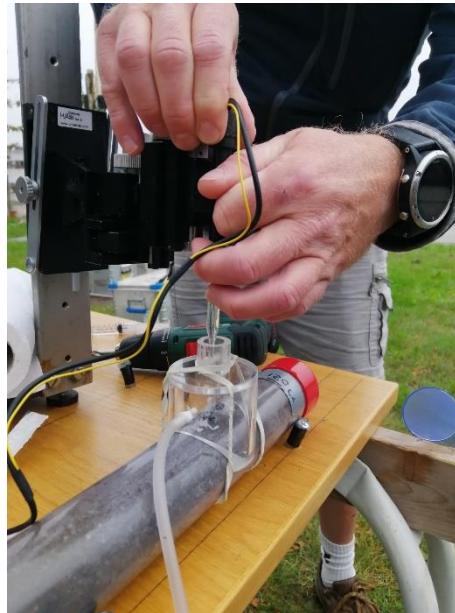
2D EP



Figur 7.1 Konturkort med PCE-koncentrationer i jord, nordligt område.



Figur 7.2 Konturkort med TVOC-koncentrationer i jord, nordligt område.



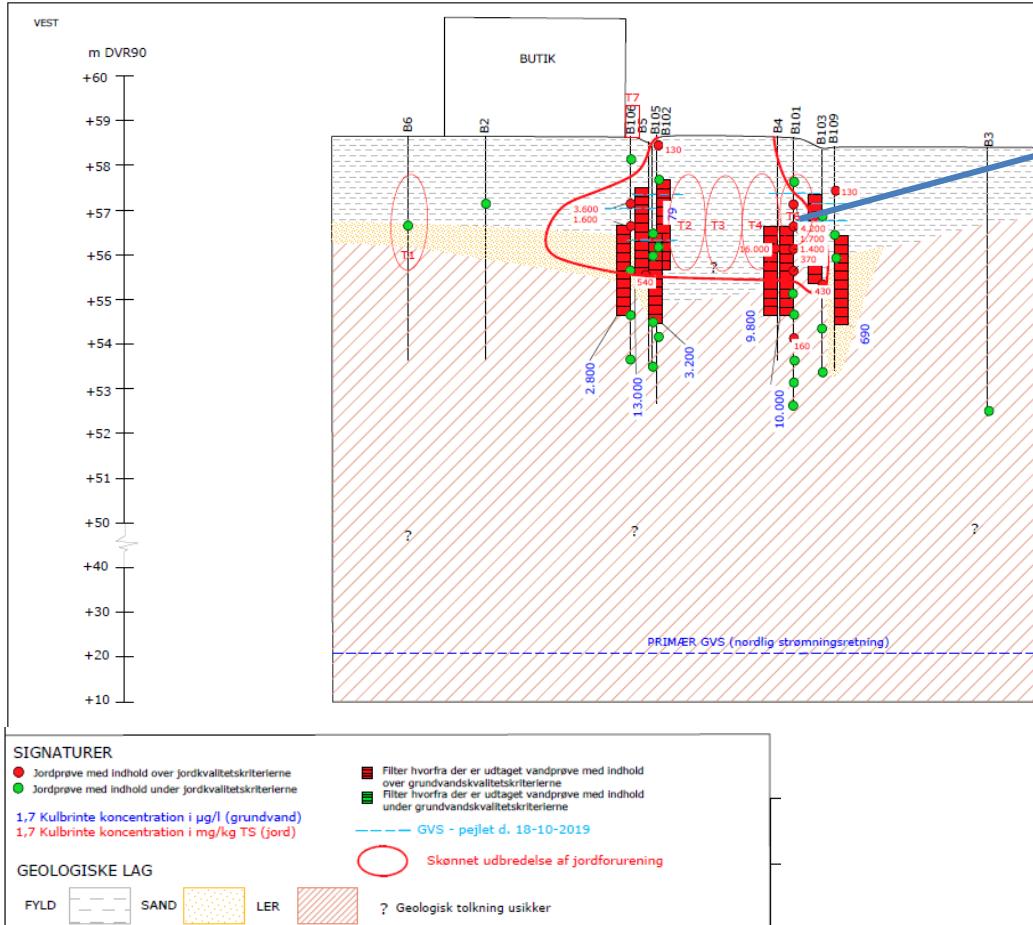
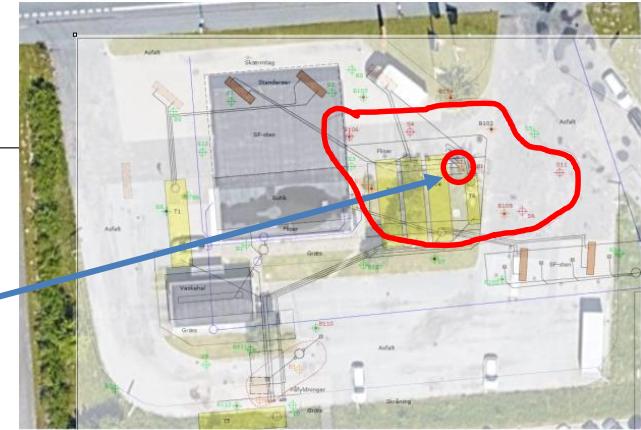
Grund med olie-forurening

Tankstation 1973-2018, ved indledende forureningsundersøgelse konstateres jord- og grundvandsforurening med nedbrudt dieselolie og benzin

Kortlagt på vidensniveau 2 i 2006, opgravet 2021.



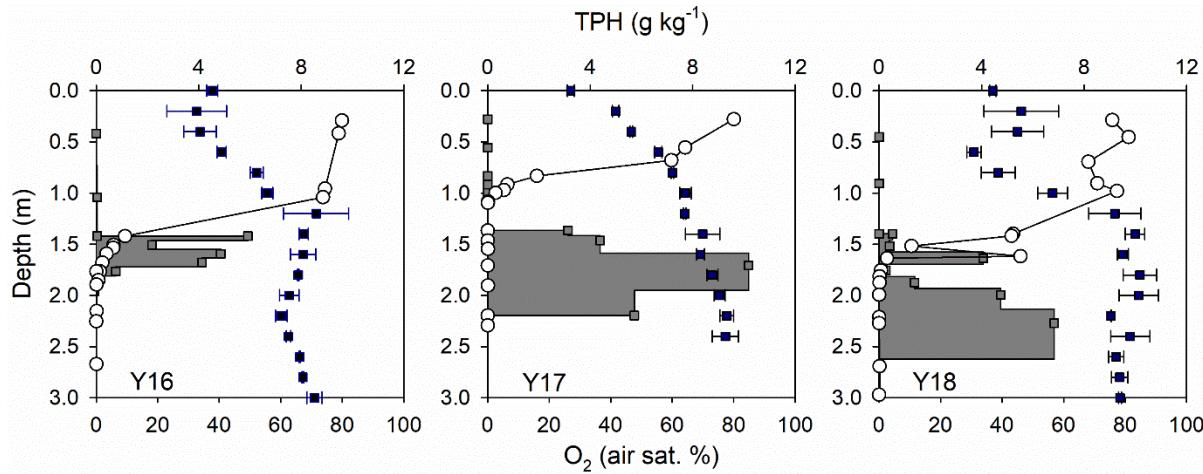
Grund med olie-forurening



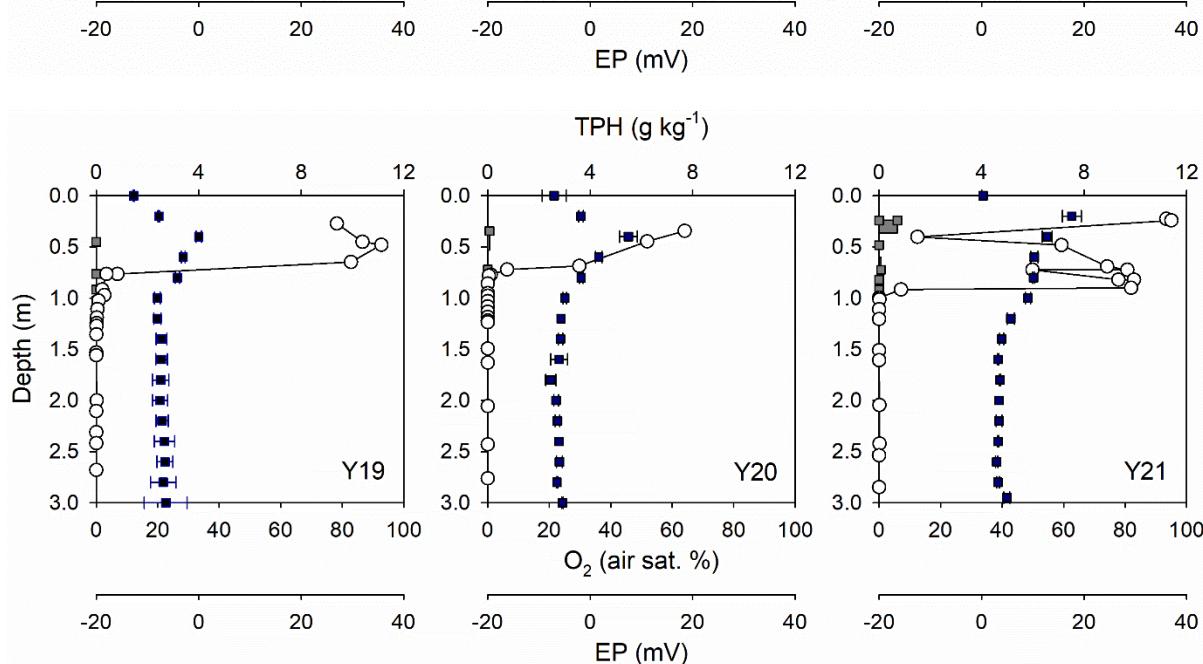
- Koncentrationsniveauer op til 16 g/kg
- Dybde: ca. 1.5 m
- Grundvandspejling ca. 40 m

Grund med olie-forurening

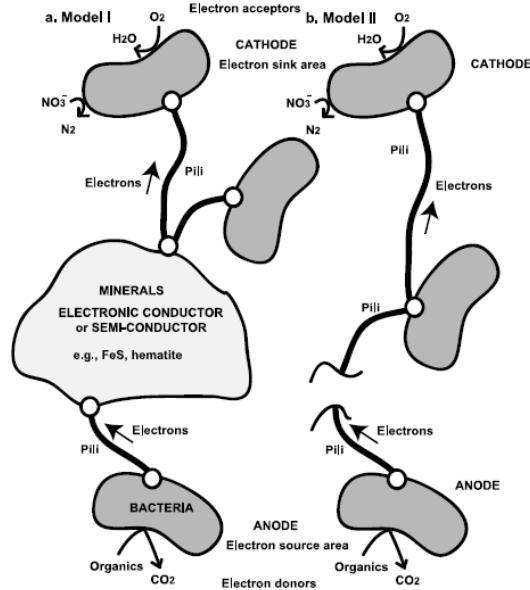
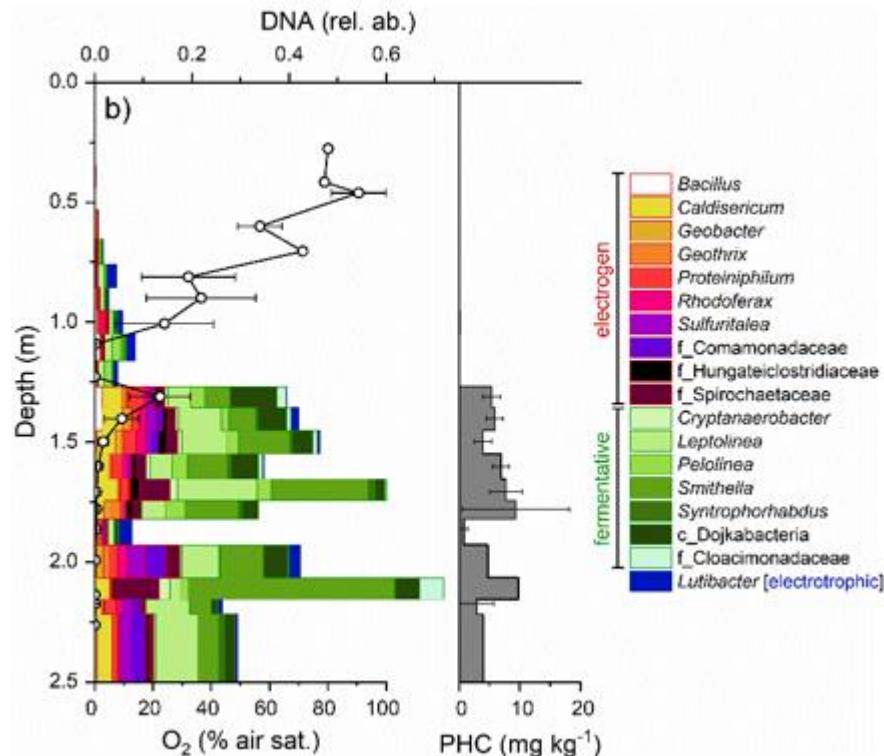
Hot spot



Uforurennet



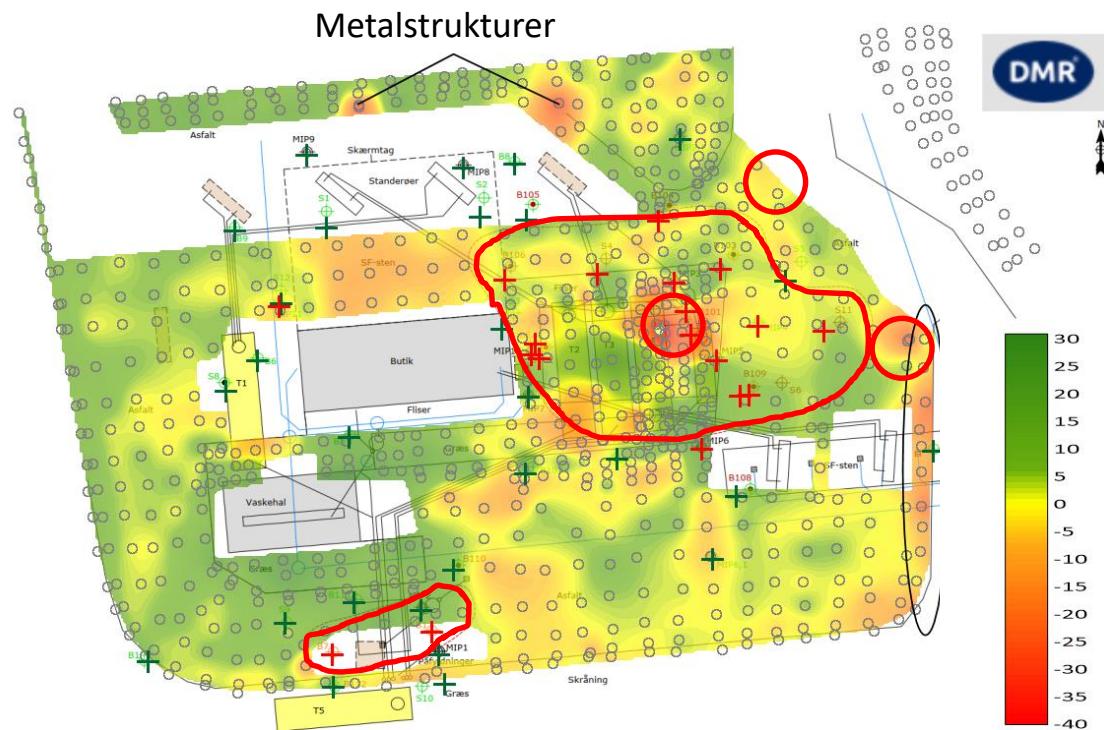
Kabelbakterier?



Revil, A., et al. (2010). *J. Geophys. Res.-Biogeosciences* **115**: G00G02.

Grund med olie-forurening

Elektrisk potentielle (2D) og forurening





Konklusioner:

- EP metoden kan bidrage til lokalisering af olieforurening
- Metoden er hurtig og billig
- Betydelig gevinst at hente ved at forbedre tolkning af effekter af overflader og belægninger

Gode grunde søges! Kendt – gerne ukompliceret – udbredelse, minimum af belægninger/bygninger/installationer, helstolie men også klorerede.

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