



REMTECH

Innovative passive sampling technology for improved groundwater and surface water monitoring.

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SESSION: INNOVATIVE TECHNOLOGIES IN SITE CHARACTERIZATION AND SITE REMEDIATION

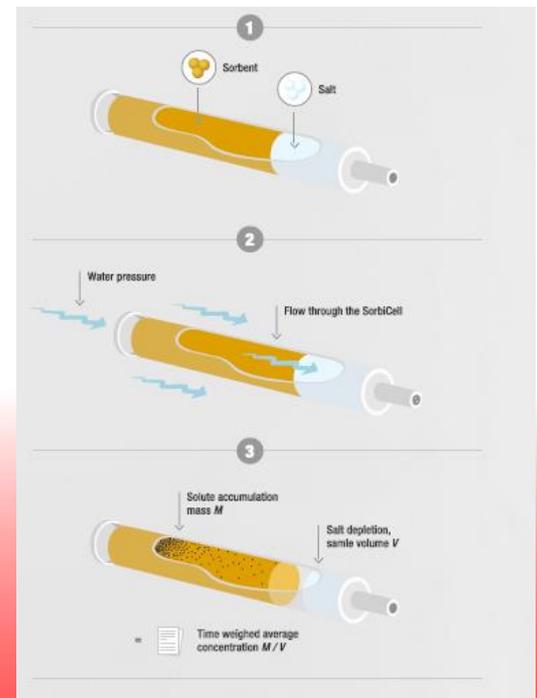
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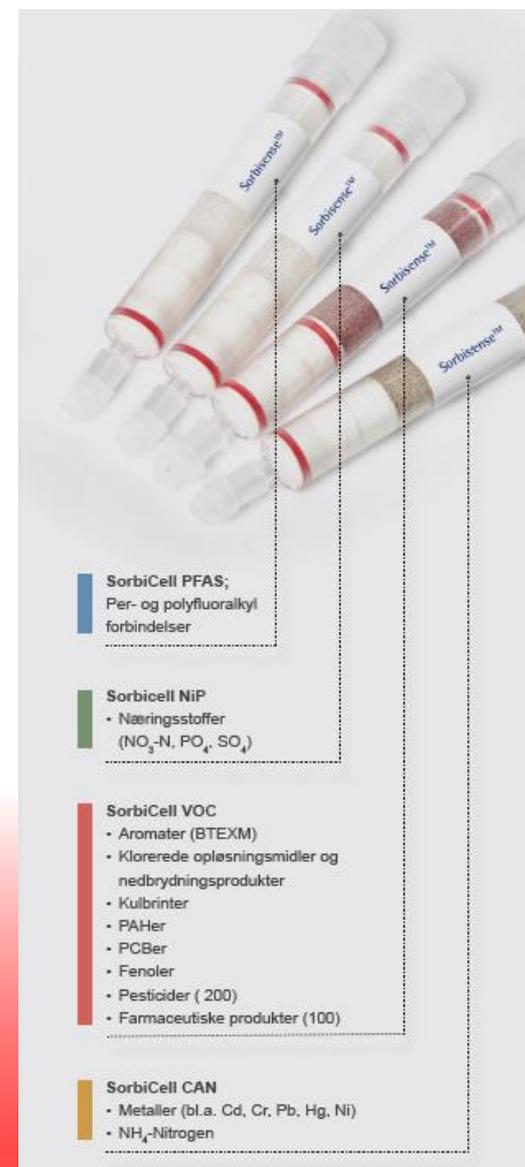
SorbiCell overview

- ❑ Advective Flow passive sampling
 - ❑ Accumulated average concentration
 - ❑ No use of electricity, pumps etc.
 - ❑ Applicable for ground- and surface water
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- ❑ Hydraulic pressure creates flow
 - ❑ Sample volume typically 300-500 ml
 - ❑ Solutes are adsorbed (mass M)
 - ❑ Tracer salts is eluted in proportion to water volume (volume V)
 - ❑ Solutes analysed and concentration derived from M/V



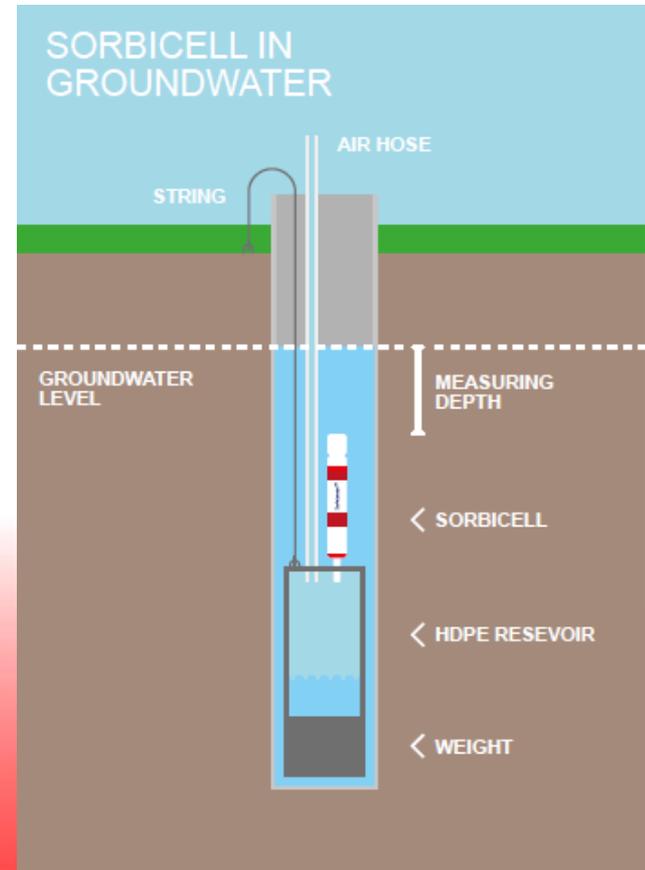
SorbiCell types - adjusted according to chemical groups

- ❑ VOC: aromatics (BTEXM), halogenates, hydrocarbons (oil, fuels), PAH 's, pesticides
 - ❑ CAN: metals, ammonium-N
 - ❑ NiP: nitrate-N, phosphorus
 - ❑ PFAS (PFC's.)
- ❑ Wide range of accredited analytical methods available (GC-MS, LC-MS, ICP)



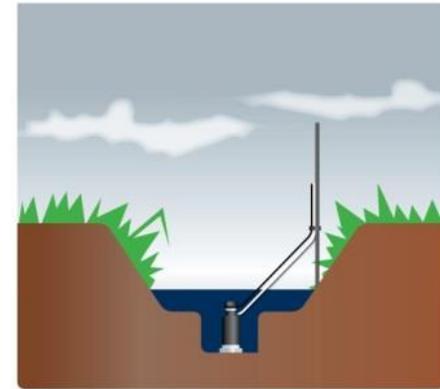
Installations in groundwater wells

- ❑ Mounting in groundwater wells (2inch)
- ❑ Submerged under water table
- ❑ Water is pressed through the cell by hydrostatic pressure
- ❑ Air is pressed out through the tube
- ❑ Reference/field volume
- ❑ Typical measurement interval: 2-4 weeks
- ❑ Possibilities for multi-level sampling
- ❑ Depth range: 0,5-150 m.u. water level



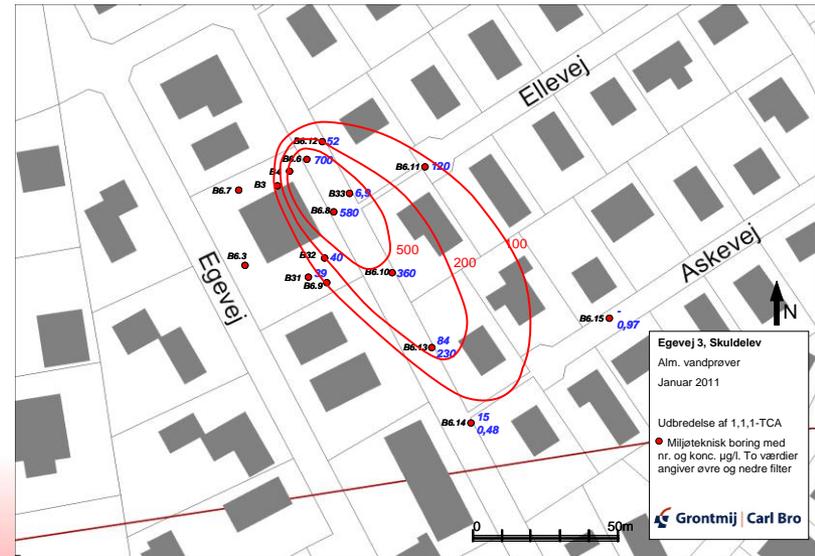
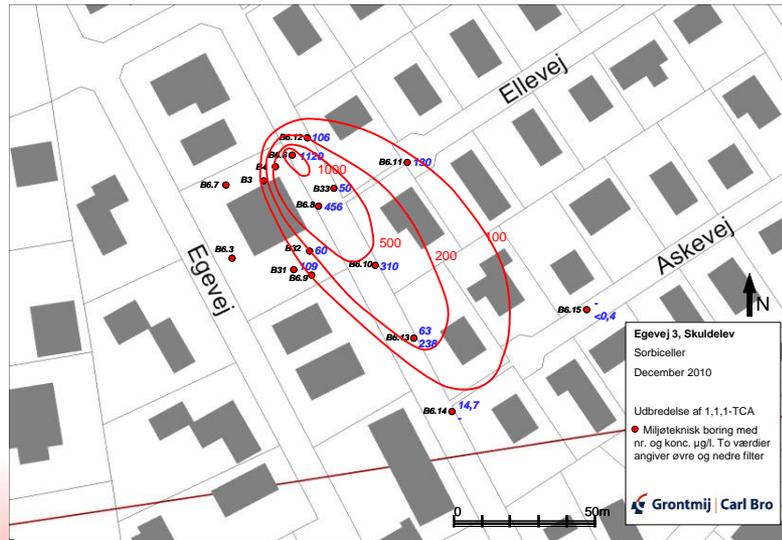
Installations in surface water

- ❑ Mounting SorbiCell is fitted in the collector and is lowered beneath the water surface
- ❑ Water is pressed through the cell by hydrostatic pressure
- ❑ Air is pressed out through the tube
- ❑ Typical measurement interval: 2-4 weeks
- ❑ Depth range: 0,5-10 m.u. water level



Groundwater case: Capital Region of Denmark

- plume delineation in 3D; Chlorinated solvents

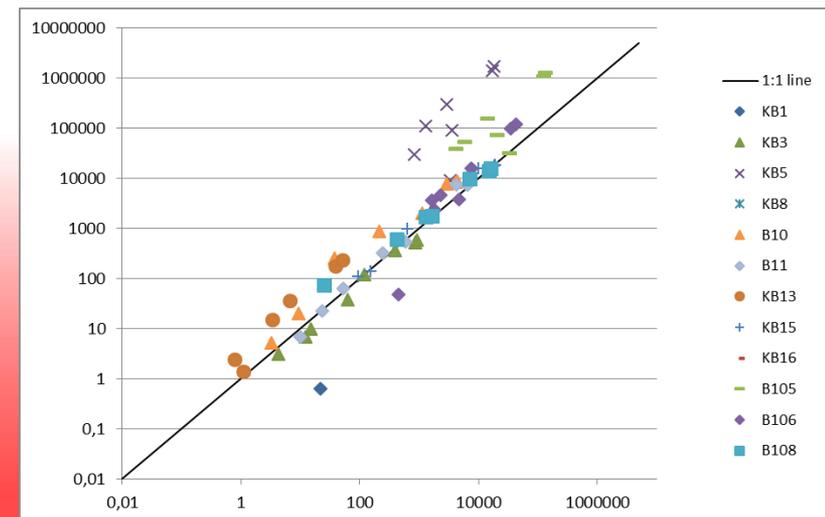
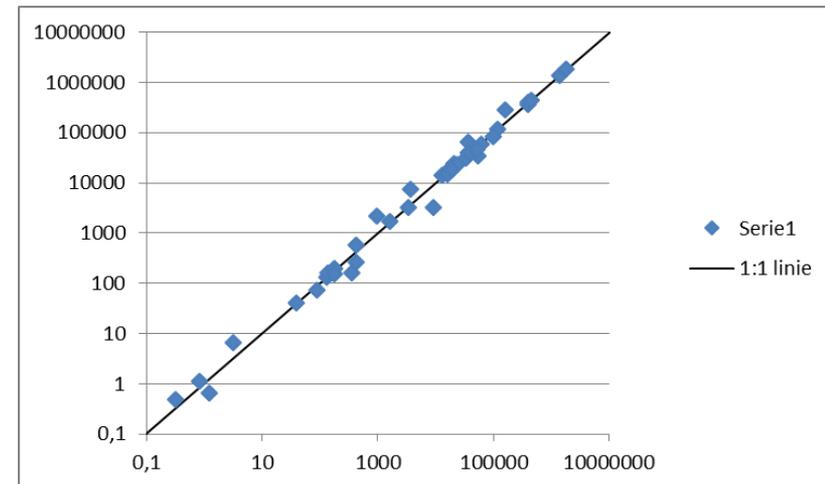


Short filters / horizontal plume delineation

Groundwater Case: Oil company

- Fuel spill and monitoring of plume removal

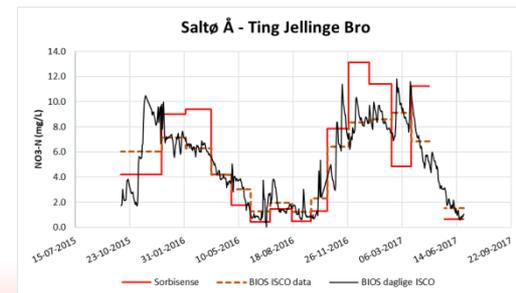
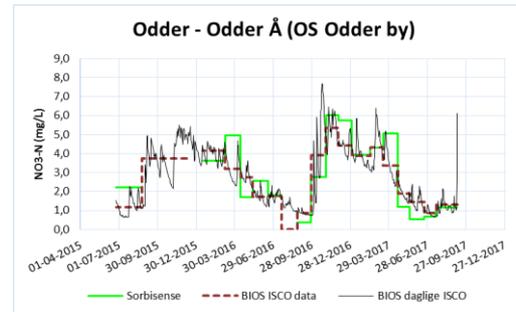
- ❑ Full-scale monitoring of plume mass balance at gas station
- ❑ Duplicate analyses shows high precision over six orders of magnitude of concentration range (RSD = 17%)
- ❑ 1:1 comparison with grab samples shows highly comparable results
- ❑ Up to 70% time-savings in field
- ❑ Also applicable for low-yielding wells



Surface water Case: SEGES / Aarhus University

- Nitrate monitoring in streams

- Full-scale monitoring nitrate concentrations in surface water streams
- Monthly sampling and comparison with daily grab samples shows highly comparable results
- High potential of cost savings
- Useful for screening and pollution mass balances in streams



Key advantages



- ❑ Accumulated average concentration rather than a “snap-shot” value
- ❑ Suitable for a wide range of contaminants, i.e. organic volatiles AND non-volatiles; inorganic macro AND micro constituents
- ❑ Direct, transparent volume-based calculation of solute concentrations (no equilibrium assumptions, no diffusion calibration)
- ❑ Easy field procedure, single-person operation
- ❑ No electrical components and subsequent safety precautions at hazardous sites
- ❑ Improved logistics

GRAZIE PER L'ATTENZIONE,

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