



Sorbisense passive sampler

Measurements of water quality in
groundwater and surface water

Dr. Hubert de Jonge, Sorbisense,
Denmark

Nicole Network Meeting, May 10-12,
2006, Carcassonne, France

Innovations and practical experiences
with in-situ measuring and monitoring



Affiliation

Sorbisense is a Danish based technology company. Spin-off from Danish Institute of Agricultural Sciences

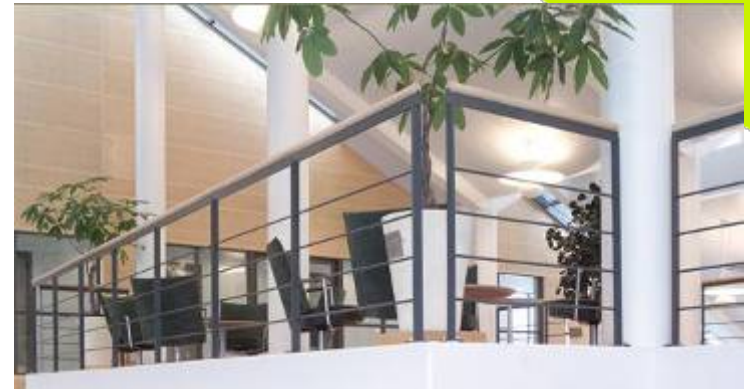
Private limited company, backed by venture and private investors.

Founded in 2004 by:

Dr. Hubert de Jonge, soil scientist
(Sorbisense)

Dr. Gadi Rothenberg, chemist
(Amsterdam University)

We manufacture and market passive sampling devices for environmental applications



How we are doing

We have two worldwide patents pending on new sampling methods and its applications.

We are currently involved in 7 monitoring projects, 5 in Denmark (nitrate/phosphate/organics in groundwater, drain water) and 2 in the Netherlands (organics in groundwater).

Commercial project at Copenhagen Waterworks.



Water monitoring problems

Limit: chemical parameters

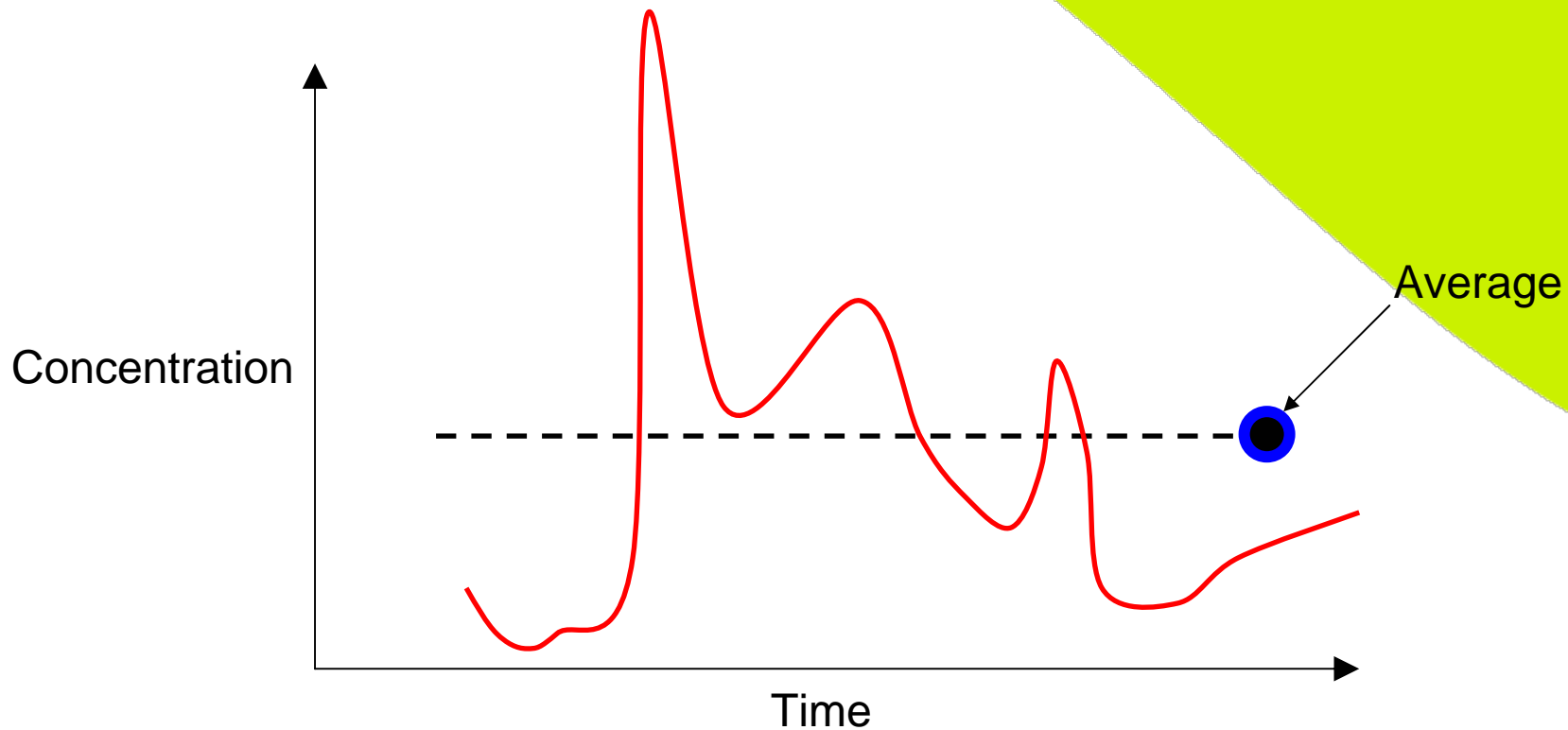
Traditional water quality monitoring is mostly done by 'grab sampling'.

You take a liter of water to the lab, extract it with a solvent/reagent, and analyse it by HPLC, GC, etc..

This gives you a 'snapshot' of the situation, but no time-resolved information.



Time-averaged sampling



Environ. Sci. Technol., **2005**, 39, 274.

The Sorbisenze solution

You place Sorbisenze equipment in the field, e.g. a groundwater well

The sampler collects the desired contaminant over the sampling period
Customer specific: from days to months).

You take the sampler to the lab, extract and analyse by standard methods, and retrieve a weighed average concentration.



How it works

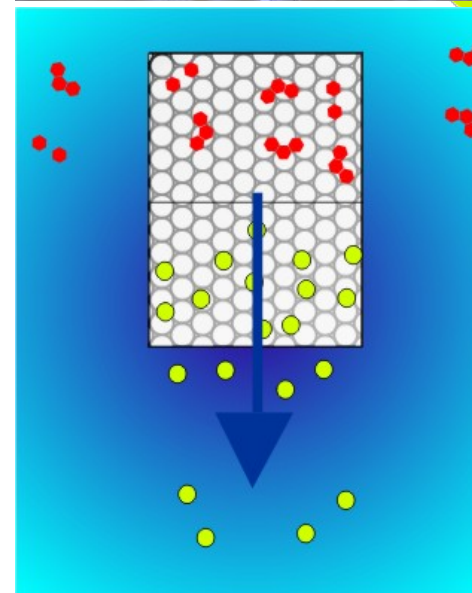
The sampling cartridge, SorbiCell, is porous and permeable to water.

It contains an adsorbent and a tracer compound.

SorbiCell is brought into capillary contact with surrounding water

A dissolved mass of solutes **M** is adsorbed.

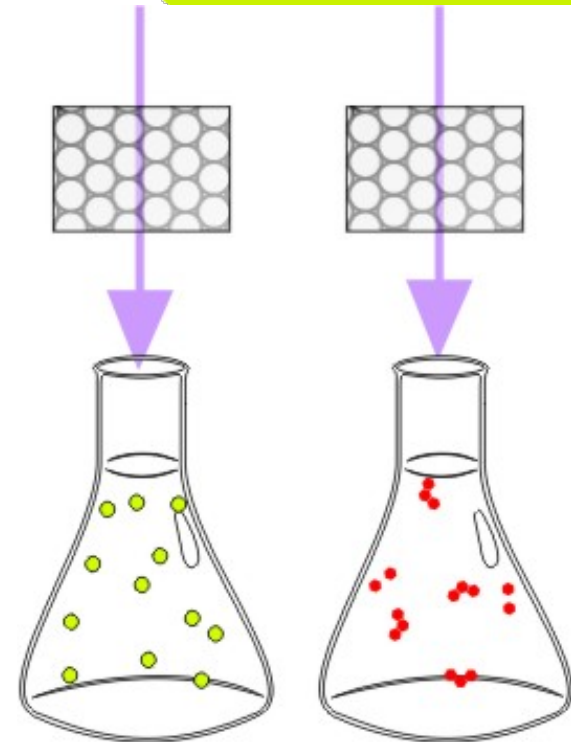
The tracer leaches in proportion to water volume, **V**.



Analysis in the lab

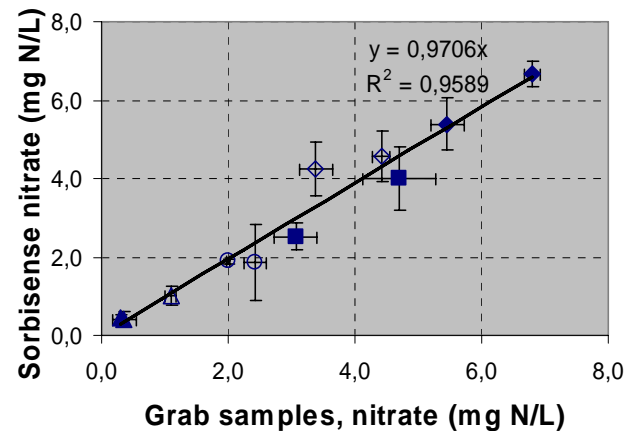
The cartridges are extracted and analysed in the laboratory with standard methods (GC/HPLC/etc.).

The ratio M/V gives the average solute concentration during the installation period.



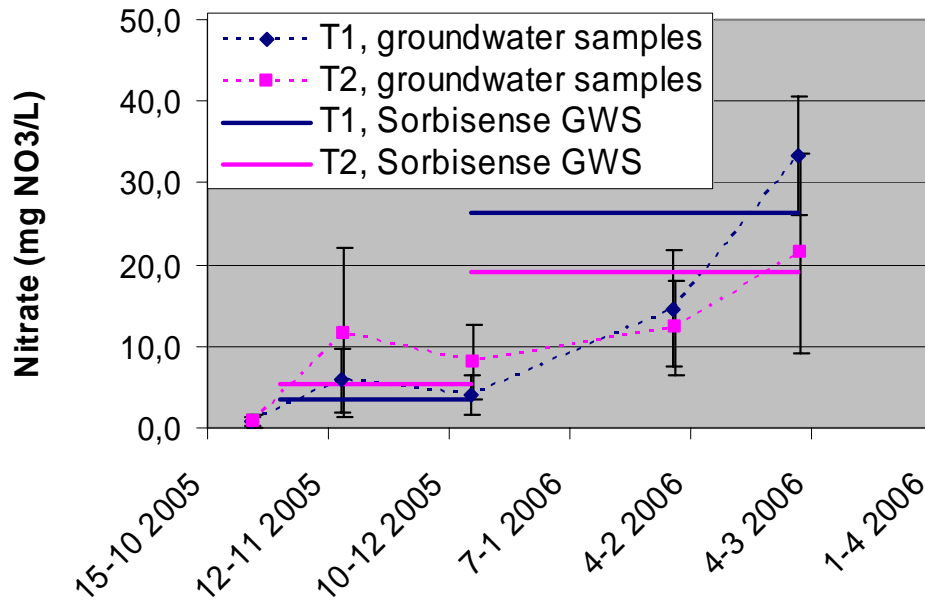
Field validations (1)

- DK, Aarhus County, 2005
- Surface streams, 14 days installation
- Nitrate, phosphorus
- Successful 1:1 correlation with water samples ($R^2 = 0,96$)
- Repeatability: 10-15% of measured value



Field validations (2)

- DK, Industrial customer, 2005-2006
- Groundwater wells
- Nitrate, phosphorus
- Time-averaged concentrations
- Cost reduction



Field validations (3)

- Ongoing cooperation with private consultants, accredited lab, universities, industry
- Groundwater wells, influent/effluent water
- Solutes:
 - Chlorinated Solvents
 - Cresol/Phenolic compounds
 - BTX
 - Pesticides
- Operational applications available

A competitive edge

Reliable data: Averaging over time and volume gives a clear and accurate picture supporting decision making.

Cost-effectiveness and logistics: Site visits, sample handling, maintenance are minimized/simplified. 40% cost reduction is feasible

Flexibility: Sorbisamplers can measure nitrate, phosphates, pesticides, volatile organics (VOCs), heavy metals etc..





Thanks for your attention!

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