



MITEN VARMISTETAAN NÄYTTEEN EDUSTAVUUS, KUN PERUSTETAAN VEDENLAADUN AUTOMAATTINEN MITTAUSASEMA?

FINNTESTING SYYSSEMINAARI 21.11.2017
JARMO LOHILAHTI, SALES MANAGER

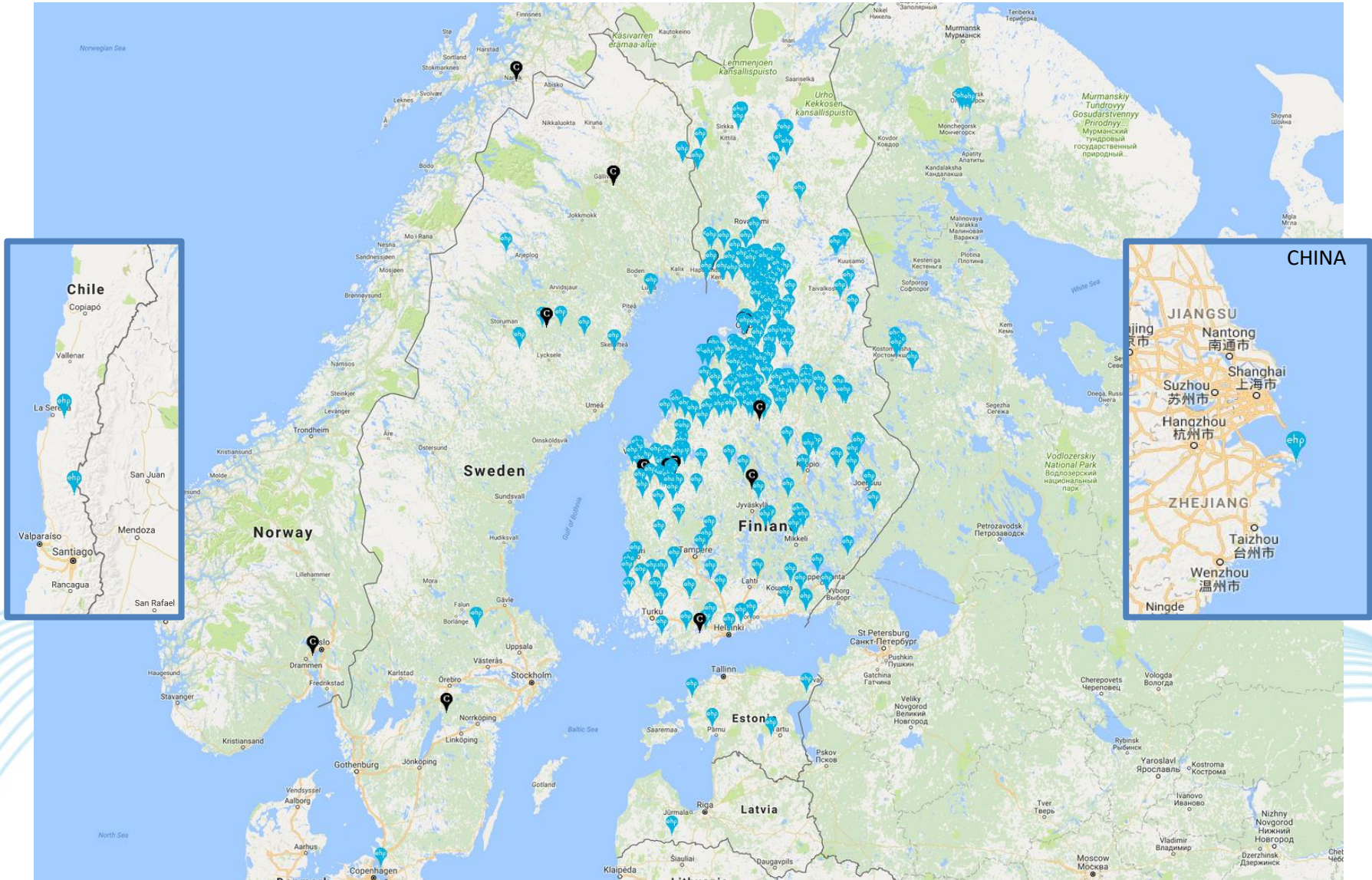
EHP Environment's Mission:

“To improve Environment by producing reliable water and weather information and by helping customer to optimize water management and purification processes”

EHP ENVIRONMENT LTD

- 700+ remote online measurement stations in Finland, Sweden, Russia, Norway, Latvia, Estonia, Chile, and China
(+ 200 stations for hydrological monitoring in Finland 2017-2019)
- Customers: mining, pulp&paper, energy, water authorities, agriculture, aquaculture, ports, civil engineering,...
- A measurement system integrator and solution provider for companies and environmental authorities.
- Sales and service personell and certified field sample collectors.
- Strategy – to be an **accredited** online water environment measurement service provider

EHP ENVIRONMENT'S MEASUREMENT STATIONS



PARAMETERS



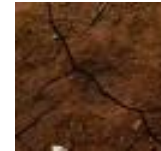
Water

- Water level
- Flow rate
- Suspended solids, turbidity
- Dissolved metals
- Dissolved oil
- Temperature
- Electrical conductivity
- pH
- Nitrate, nitrite
- Ammonium
- Phosphorous
- Blue algae
- Chlorophyll-a
- Redox
- Dissolved oxygen
- COD/BOD/DOC/TOC
- Etc.



Weather

- Wind speed&direction
- Rain
- Air pressure
- Humidity
- Radiation
- Temperature



Soil

- Pore pressure
- Moisture
- Inclination
- Soil movement
- Etc.



REFERENCES

NETWORK/REFERENCES



AGNICO EAGLE



NORILSK NICKEL



storaenso



FINNISH WATER FORUM

MINING FINLAND



Baltic Blue Bio Alliance

Benefits of online measurement and data management system

- Real-time status – one always knows what is happening and can:
 - control up- or down-stream process and save in OPEX
 - get early-warnings of possible threats
 - monitor water balance automatically
- Cost efficiency – reduces the total costs of environmental management
 - Proven quality and reliable, operator independent online analysis in contrast to traditional manual sampling
 - Time savings – environmental reporting whenever needed, not just the annual reports
 - Enables easier reporting to authorities – faster environment permits and better communication
- Represents BAT (Best Available Technology) and BEP (Best Environmental Practice), maximizes environmental safety and answers the ISO 14001 standard's tightening challenge for risk management



PRODUCTS

Software and hardware. Sensor examples

SCHEMATIC PRODUCT DELIVERY LAYOUT

Environmental Monitoring Concept

Hardware

Measurement wells
Measurement buoys
Weather Stations
Ground water pipes

Electronics integrated and
tested in workshop
conditions: EHP Datalogger,
solar panels, accumulators,
2G/3G modem, sensors

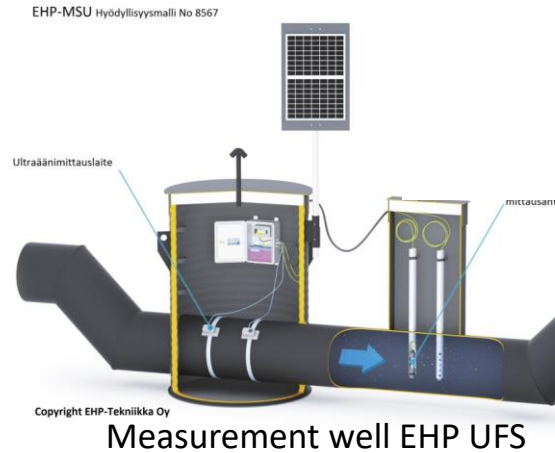
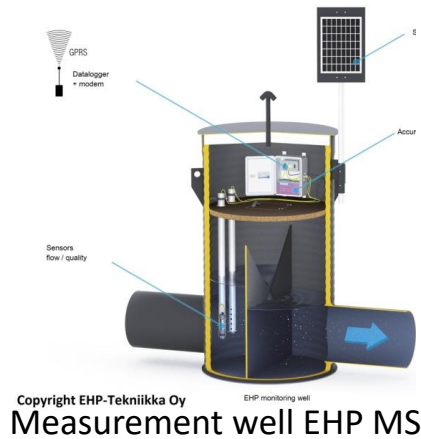
Software

EHP Dataservice
EHP Web

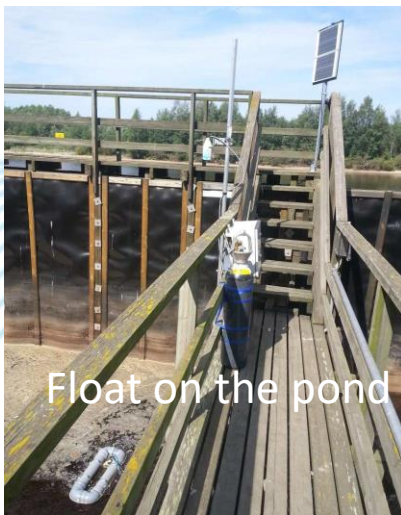
Early warning system
Online database
Trends
Reports
Map user interface
Remote service support

MEASUREMENT STATION DELIVERIES

STANDARD PRODUCTS:



CUSTOM INSTALLATION EXAMPLES:



EHP-ENVIRONMENTAL BUOY

Installed in pond, lake, river or sea.

Is equipped with suitable technology.

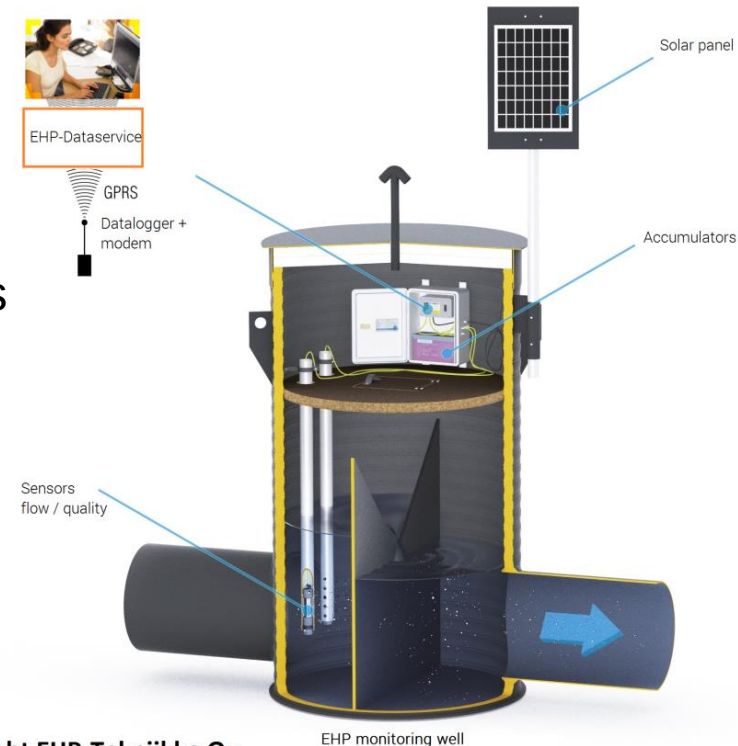


EHP MONITORING STATIONS

EHP-MS

Patented floor design and thermal insulation prevents water from freezing and enables measuring online even in harsh outdoors conditions

Is installed in pipelines, outlets, ditches, streams and equipped with needed sensors

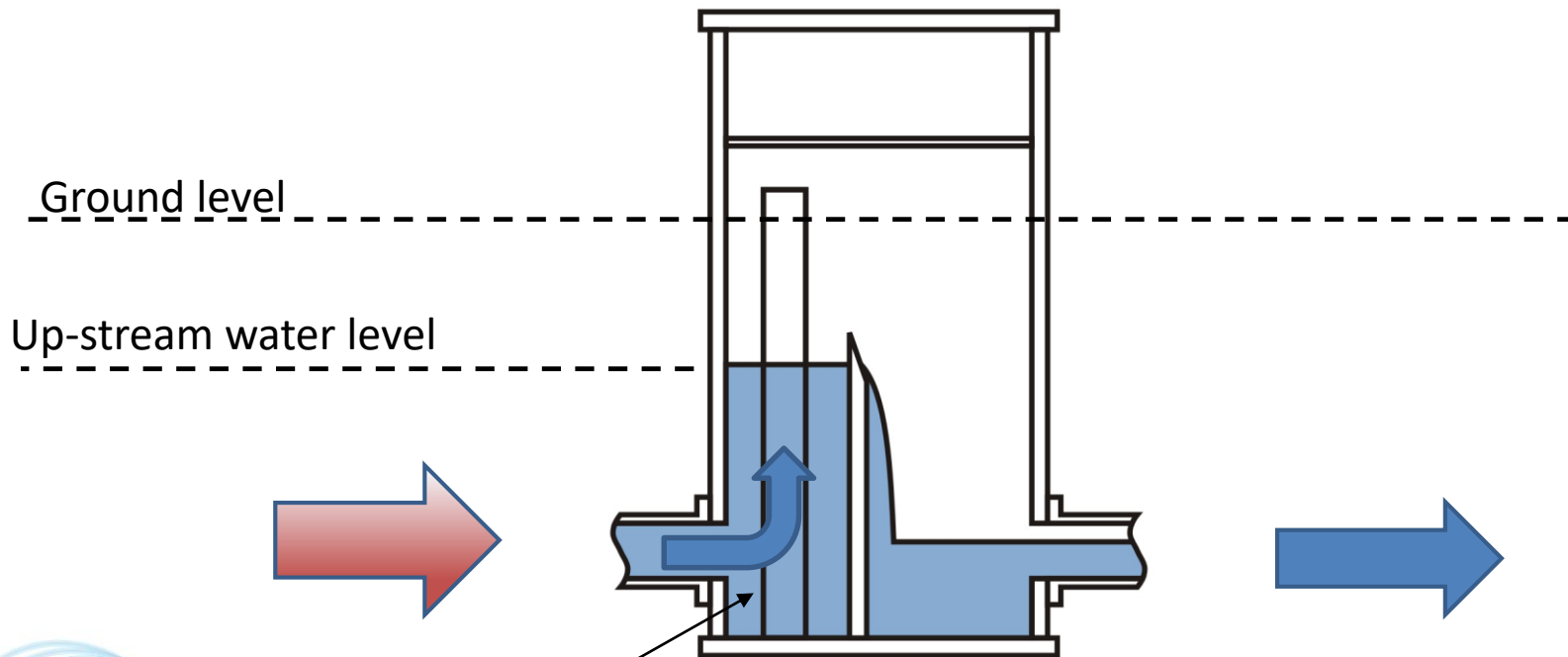


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EHP MONITORING WELL INSTALLATION

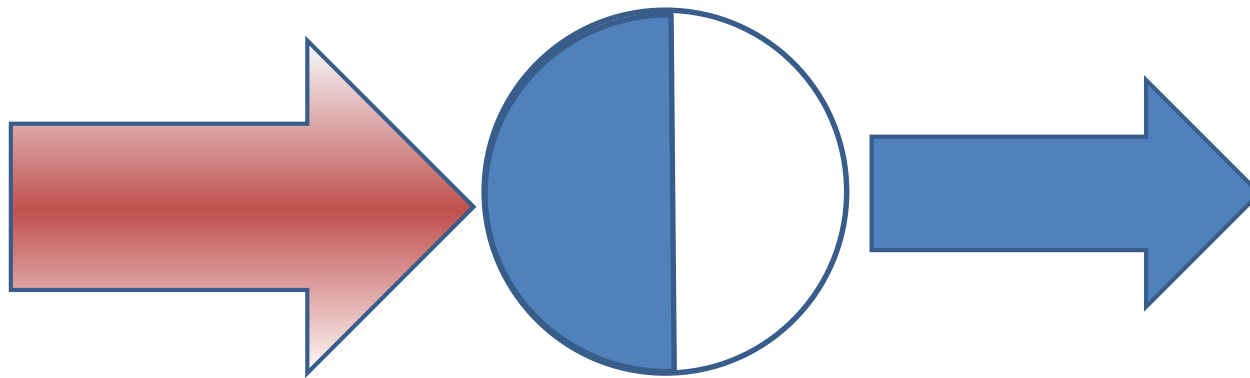


EHP-MS OPERATING PRINCIPLE



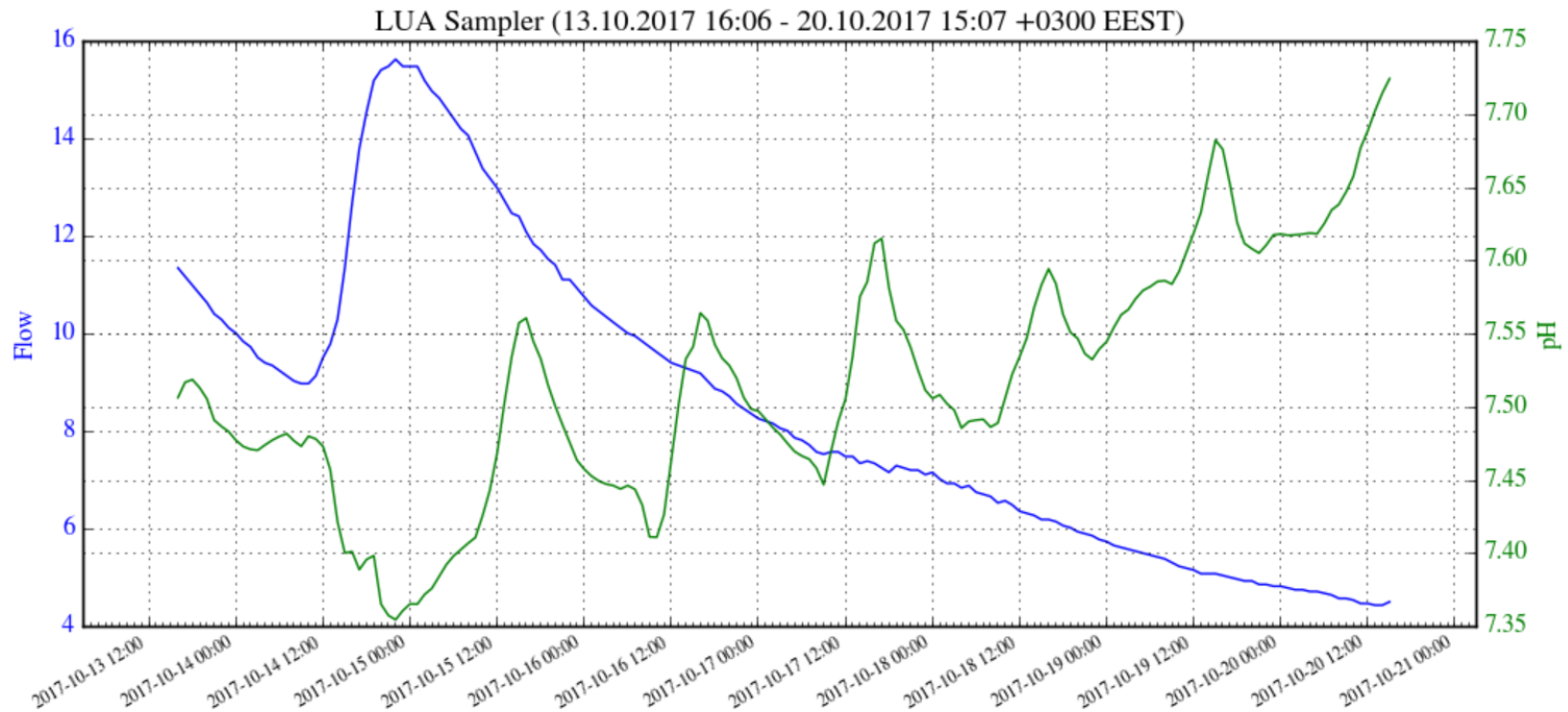
Vertical heterogeneity in the incoming flow.
The whole stream is forced to flow through the mixing chamber
where sensors are located.

EHP-MS OPERATING PRINCIPLE



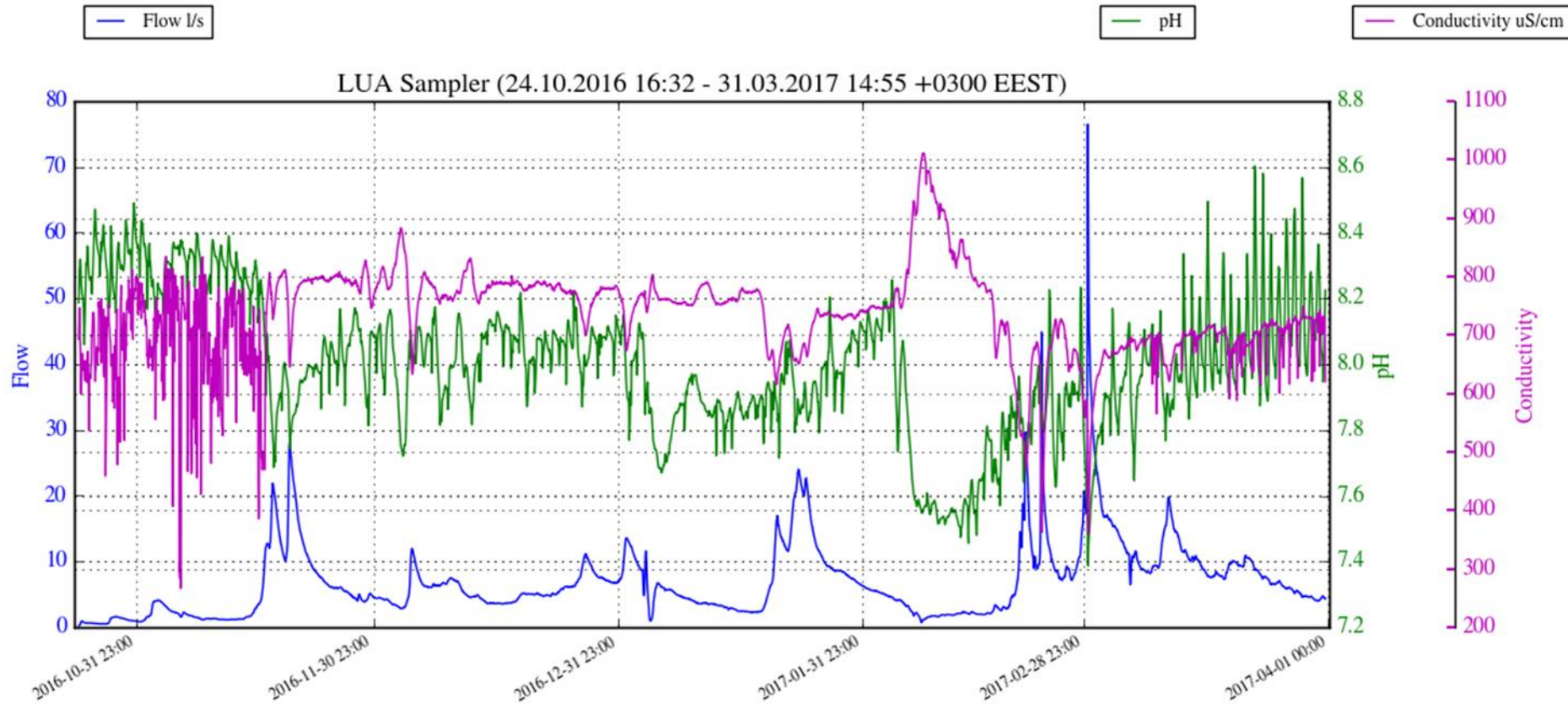
Horizontal heterogeneity in the incoming flow.
The whole stream is forced to flow through the mixing chamber where sensors are located.

TEMPORAL VARIATIONS / 1



Short term variation in pH, highest values at 4 pm

TEMPORAL VARIATIONS / 2



In a long run varying flow and quantity variations are observed

REPRESENTATIVITY IN AN AUTOMATIC WATER QUALITY MEASUREMENT STATION

1. Spatial representativity by mixing the whole flow in the measurement chamber
2. Temporal representativity by sufficient number of samples. Eg automatic measurements every 15 minutes gives 35000 analysis in a year

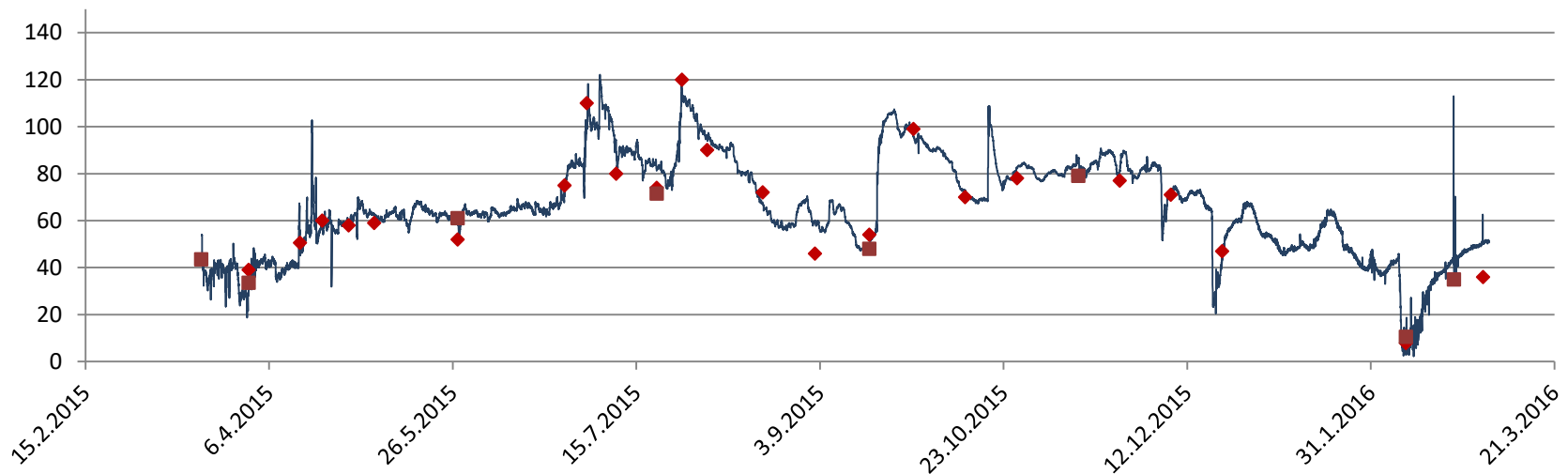


ENVIRONMENTAL MONITORING METHODS

Studies of total measurement errors in environmental analysis

COMPARISON OF ONLINE AND MANUAL MEASUREMENTS

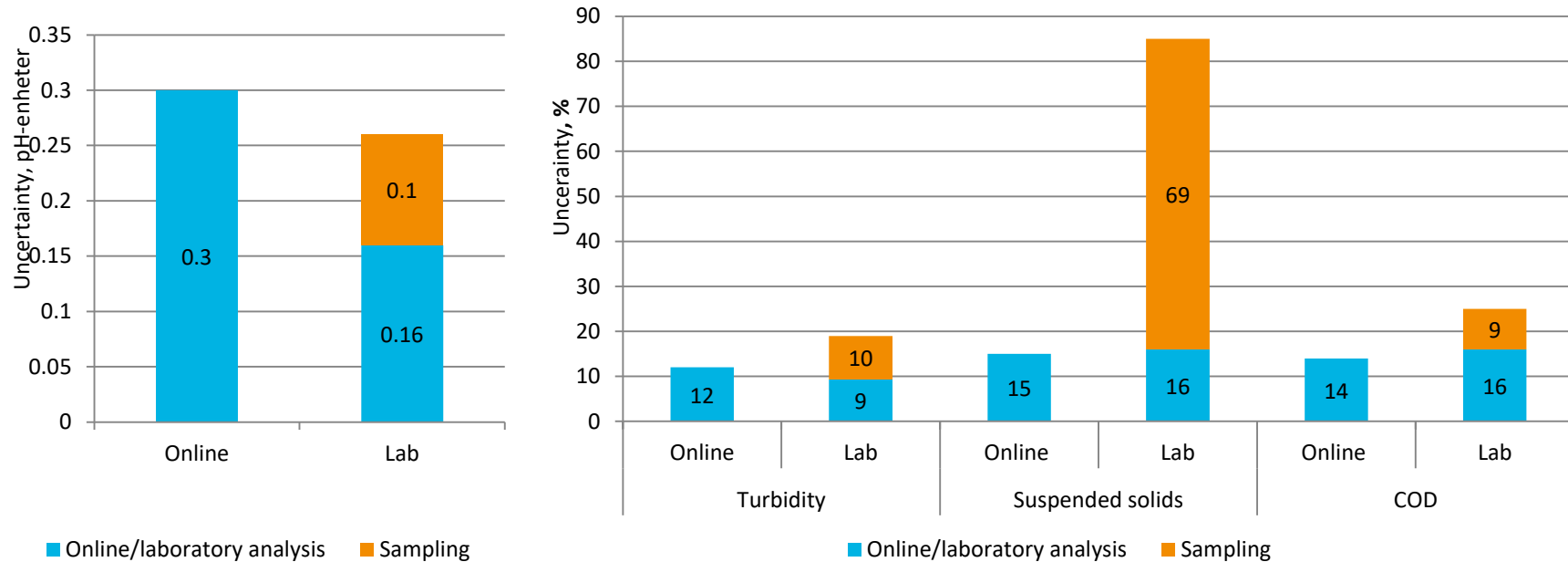
Iso Kerus bog, manual and online COD analysis



Continuous online analysis enables to

- see the changes in the process and do control actions subsequently
- calculate true environmental load

MEASUREMENT UNCERTAINTY = SAMPLING UNCERTAINTY AND ANALYSIS UNCERTAINTY



2U = expanded measuring uncertainty with factor 2 (95% confidence)

Ref. On line monitoring and manual sampling uncertainty. Maija Ojanen-Saloranta 2016, Centre for metrology Mikes, Finland

- Manual sampling increases uncertainty of laboratory analysis.
- Total uncertainty of online measurement is the same or better than laboratory analysis
- Customer applied and got new environmental permit where laboratory analysis were replaced with online measurements. Dnro LSSAVI/4610/2016

MONITORING METHOD COMPARISON

	Laboratory	Online measurements
Maturity	+ Established in environmental monitoring	+ Established in process control, partially in environmental monitoring
Delay	- Hours, day(s), week(s)	+ No delay
Damage prevention	- Not possible	+ Possible
Environmental load	- Environmental load variations unobserved	+ Realistic environmental load observed
Process control	- Not possible	+ Possible, ->OPEX savings
Service	- Laboratory's own service - Manufacturer's service	- Instrument maintenance personel - Manufacturer's service
Sampling	- Sample collection and treatment significant error sources, often unidentified	- No sampling error in <i>In situ</i> -measurements, no operator dependent error
Analyses	+ Several analyses in the same time	+ Most important analyses
Data processing	- Requires often manual data processing	+ Automatic, manual processing minimized



environmental solutions.

LINKS

- www.ehpenvironment.com
 - company web page
- www.ehp-data.com
 - data cloud service
 - Username public, password public
- Youtube
 - <https://www.youtube.com/watch?v=WqT5ppT0M4E>
 - <https://www.youtube.com/watch?v=5nytWNt-0SU>