Hushållnings
sällskapet

Andreas Gustavsson

Teknik för högfrekvent ”kontinuerlig” mätning av fysikalisk kemiska (och biologiska) kvalitetsfaktorer i ytvatten

Temporal Monitoring of Organochlorine Compounds in Seawater by Semipermeable Membranes following a Flooding Episode in Western Europe - Environmental Science & Technology (ACS Publication
Real-time remote monitoring of water quality: a review of current applications, and advancements in sensor, telemetry, and computing technologies
A remote wireless system for water quality online monitoring in intensive fish culture
Wireless in-situ Sensor Network for Agriculture and Water Monitoring on a River Basin Scale in Southern Finland: Evaluation from a Data User's Perspective | HIML
OGC® Sensor Web Enablement: Overview and High Level Architecture - Springer
IEEE Xplore Abstract - SmartCoast: A Wireless Sensor Network for Water Quality Monitoring
Optochemical sensor for water monitoring based on SnO2 particle layer deposited http://adsabs.harvard.edu/abs/2006ApPhL..89t1103C
Water Quality Monitoring System Using Zigbee Based Wireless Sensor Network - Universiti Teknikal Malaysia Melaka Repository
Thomson Reuters - IP & Science - InCites
Wireless sensors in agriculture and food industry—Recent development and future perspective
Regional and on-farm wireless sensor networks for agricultural systems in Eastern Washington

Teknik finns

Integration of Wireless Sensor Networks into Cyberinfrastructure for Monitoring Hawaiian "Mountain-to-Sea" Environments - Springer
FloodNet Overview
LARGE AREA HYDROLOGIC MODELING AND ASSESSMENT PART I: MODEL DEVELOPMENT - Arnold - 2007 - JAWRA Journal of the American Water Resources Association - Wiley Online Library
Retention performance of a constructed wetland as measured automatically with sensors
SAM Viktiga datum - Jordbruksverket
Water Quality Analysis Information | Thermo Fisher Scientific
Orion™ AquaMate 8000 UV-Vis Spectrophotometer
WTW – TresCon® analyzer for total phosphorus
Sensors in the Stream: The High-Frequency Wave of the Present - Environmental Science & Technology (ACS Publications)
Alliance for Coastal Technologies - Nutrient Sensor Challenge
Nutrient Challenge Test Protocols_FV16-01.docx
Nitra Pod – by Decagon Devices
Home - Real Tech Inc
Adjusting_the_Frequency_of_Automated_Phosphorus.pdf
Systea Scientific papers referring to our products
Alliance for Coastal Technologies - Nutrient Sensor Challenge
Pro Series 1006 Nitrate ISE Sensor | ysi.com

Men är fortfarande förhållandevis dyr att tillän
jämförelse med dagens recipientkontroll uppb
på månatliga vattenprover för analys på lab

Analyslabbet flyttas ut i fält

Provtagning och analys kombineras
Provresultaten rapporteras digitalt

Fördelarna är:

Kort tid mellan provtagning och analys

Många prover på kort tid

Omedelbar rapportering

Nackdelar

Dyr apparatur

Omfattande installation vid långtidsmätning

Behov av energikälla

Känsligt för sabotage och klimatfaktorer

Indirekt mätning av vissa parametrar

Utmaningar

Enkel installation

Minimerat underhåll

Robusthet

Stora mängder data

Fosfor

Parametrar (i urval)

Multimätare

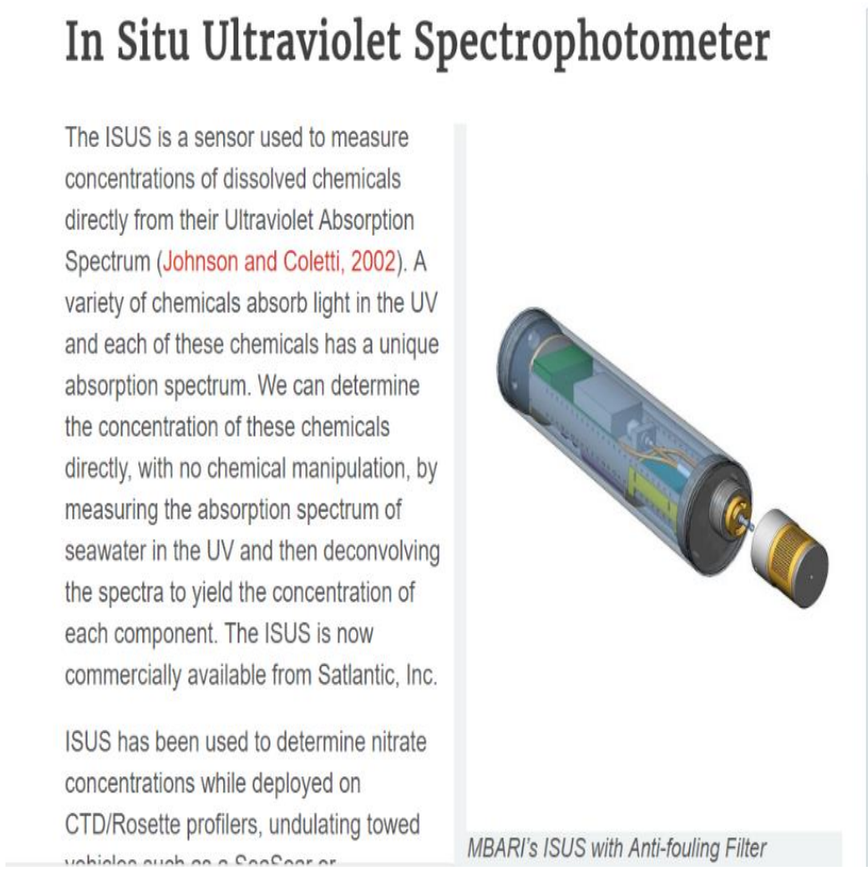
Temperature, Conductivity, Depth, pH, Oxygen Reduction Potential (ORP), Dissolved Oxygen (LDO), Dissolved Oxygen (Clark Cell), Turbidity, Chlorophyll a, Blue-Green Algae, Rhodamine WT, Ammonium, Nitrate, Chloride, Total Dissolved Gas (TDG), Ambient Light

Hydrolab HL4 Multiparameter Sonde

Tekniker

- electrode-based measurements of pH, conductivity, temperature, and dissolved oxygen (DO)
have been available for over half a century
- optical, wet analytical chemical or flow cytometry techniques (a laser- or impedance-based, biophysical technology employed in cell counting)
lab-on-chip
- advances in field deployment engineering (antifouling, batteries, micropumps), and electronics (detectors, emitters)
have reduced costs.

Nitrate



Fosfor

5500 sc
Fosfatanalysator

HACH

Den stora utmaningen:

Finns idag apparatur på marknaden för högfrekvent mätning av fosfat

Analyslabb på tub

Kräver reagenser

Utrymmeskrävande

Totalfosfor svårare

Sea-Bird Coastal HydroCycle-PO4 Phosphate Sensor

Sea-Bird Coastal's HydroCycle-PO4 is a wet chemical sensor engineered for environmental monitoring.

Fosfor

MEN

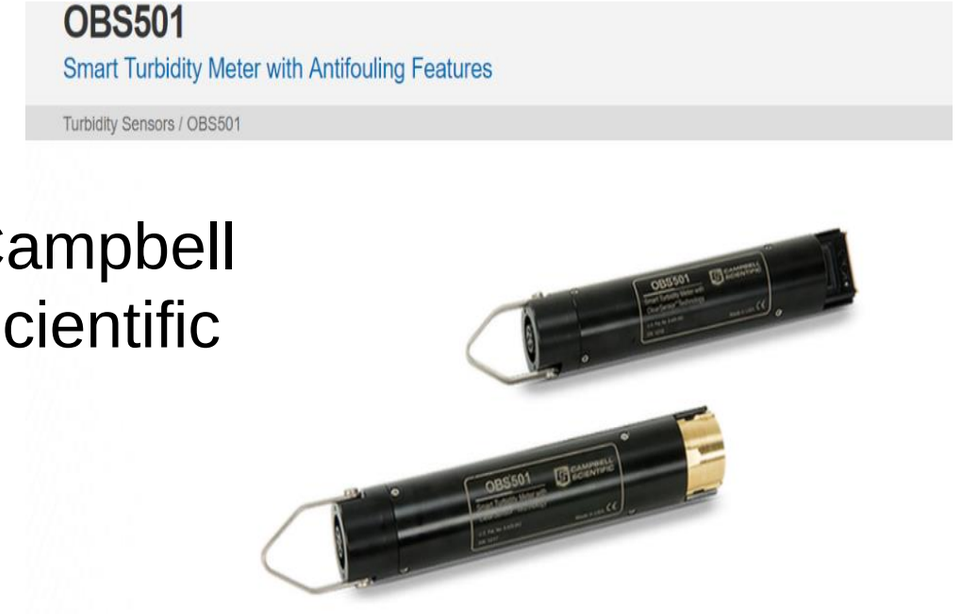
Indirekta metoder finns

T.ex. genom samband med turbiditet

Xylem

Solitax

Campbell Scientific



Fosfor

Nya metoder på väg för direkt mätning!

Colorimetric

Electrochemical

Fluorescence

Microfluidic

Optical

Flöde och nivå

Tekniker

- Bubbler Gas Flow Technology
- Doppler
- Microwave
- etc