

January 18<sup>th</sup> 2021  
Castricum, The Netherlands  
Newsletter 2021-Q1

Dear readers,

We are proud to present the first newsletter of SWAP instruments. It will appear quarterly. With this newsletter, we like to inform you about our day to day business, current projects, performance characteristics of our products and new product development. Enjoy reading!

## SWAP instruments B.V. founded!



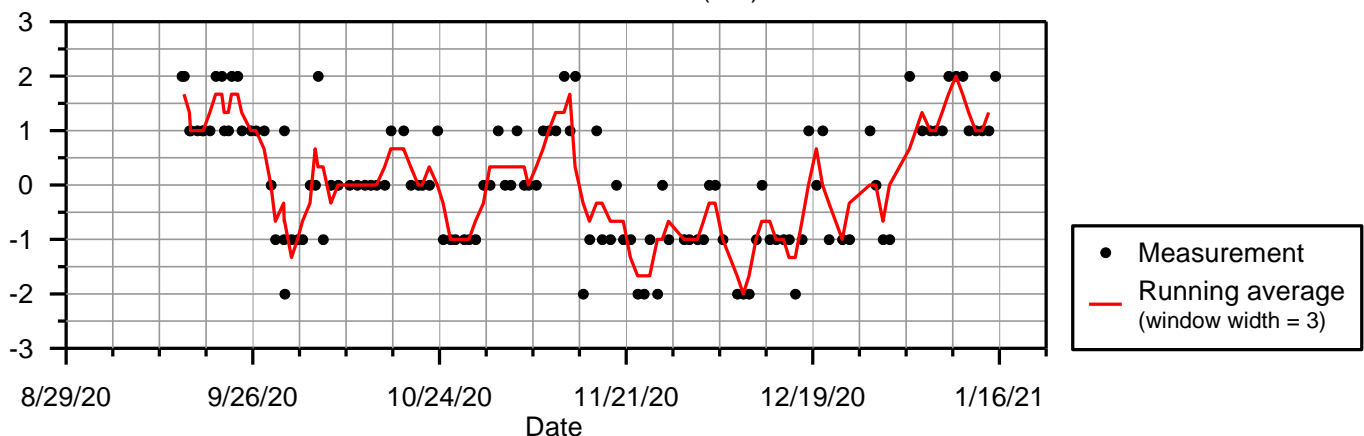
On September 4<sup>th</sup> 2020 we - Hans van Rheenen and Nikolaj Walraven - founded **SWAP instruments B.V.** We met each other 20 years ago, when we were both involved in the Eureka project FASTNAP. In this project we developed an instrument to measure nitrogen and phosphorous directly in manure on a manure transporting lorry. From then on we were involved in many sensor development projects. All related to environmental monitoring. Now we have taken up the challenge to develop, produce and deliver our own sensors and related products, to create a better environment. Visit [www.swapinstruments.com](http://www.swapinstruments.com) to get an impression of our affordable high-quality products (e.g., soil Redox and pH probes).

## SWAP instruments reference electrode



The accuracy of Redox and pH measurements depends, amongst others, on the **stability of the reference electrode**. SWAP instruments offers integrated reference electrodes in soil Redox and pH probes, and also a stand-alone version (photo). Our 3M KCl gel Ag|AgCl double junction reference electrodes enable high stability in combination with low maintenance. The stability is tested for a period of 4 months in a sandy soil under laboratory conditions. This is tested against a Metrohm 3 M KCl Ag|AgCl double junction reference electrodes. The figure below shows that the **variation** is within  $\pm 2$  mV (or 0,04 pH). This is very stable. In this test variation depends on soil water content and temperature.

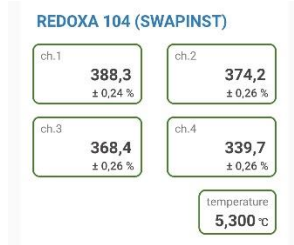
SWAP instruments vs. Metrohm reference electrode (mV)



## SWAP instruments SWI wireless interface

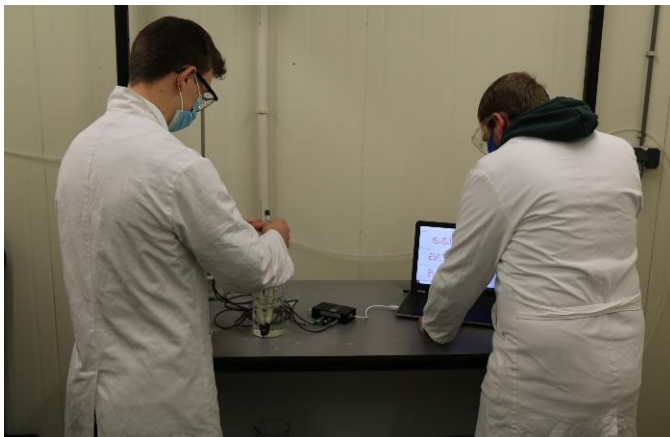


SWAP instruments is developing a **wireless interface** and **app** to connect the SDI-12 soil Redox and pH probes to a **smartphone**. The app enables to read the sensor data, to send the data to a cost-free cloud storage and to calibrate the sensors. Sensor data reports become available in Excel format. We expect to launch this product beginning of Q2 2021.



**Photo's:** Interface and app prototype testing with SWAP soil Redox probe ORP-8-4-D (Pt at 20-40-60 and 80 cm from probe top side) under field conditions.

## Testing of the chlorine probe (ChloroSens)



SWAP instruments is developing a sensor – called **ChloroSens** – for the analysis of chlorine in chlorinated water (e.g., swimming pools). This sensor consists of a pH, ORP and T electrode in a glass fibre epoxy housing with an integrated reference electrode. Three prototypes of this sensor are currently being tested by the **Centre of Expertise Watertechnology** in Leeuwarden ([www.cew.nl](http://www.cew.nl)). CEW is the Netherlands leading knowledge and innovation centre for applied research and product development in the field of water technology. The tests include determination of the performance characteristics (e.g., response time, repeatability and accuracy) and a long-term stability test.



The tests are performed by Yannick ten Caat (4<sup>th</sup> year student Biological and Medical Laboratory at NHL Stenden) and Terry Hoekstra (3<sup>rd</sup> year student Biological Medical Analyst at Nordwin College).

This research is funded by Interreg North-West Europe Water Test Network (WTN). The WTN project establishes a transnational network of testing facilities that can be used by SMEs in North West Europe to develop, test and verify new products in the water sector.

If you are interested in our products or like some additional information, please contact us at [info@swapinstruments.com](mailto:info@swapinstruments.com) or visit our website [www.swapinstruments.com](http://www.swapinstruments.com).