Case Study: Water monitoring in one of the hottest, driest regions in the World - Sudan

One of the highlights of my year was travelling to Sudan to work with The Ministry of Water Resources Groundwater and Wadis Directorate. Groundwater Basin department. Our purpose was to help the ministry set up a system to monitor the abstraction of water using our very own *vanwalt*CONNECT system.

The story begins when Van Walt was approached by a hydrologist from Sudan, Nahid Abdelrasoul who was looking to develop her skills using the latest technology available for accurately and consistently monitoring groundwater levels. Nahid is a Hydrogeologist working for the ministry and was interested in learning all about the equipment used for groundwater monitoring in the UK and Europe. With this in mind Nahid travelled to the UK for an intensive week of training with the Van Walt team, where she learnt all about the theory behind monitoring water level and quality. Nahid gained hands on experience using the equipment we take for granted in the UK including water level loggers, Xylem instruments and INW's AquiStar range of very accurate vented sensors. As a result of the training in the UK myself and Vincent were then invited to Sudan to see for ourselves the conditions in which this equipment would have to operate.

We travelled extensively throughout Sudan, from Khartoum were we saw Marawe, the largest hydroelectric station in Africa (Marawe is impressive, spanning the width of the Nile and harnessing its water) to Kassala. It was here where we installed the *vanwalt*CONNECT telemetry system. The distances between these places are incredible, at least eight hours' drive in a straight line through the baking desert, all you could see were white trees and miles and miles of sand.

The purpose of the trip was to install equipment that would deliver, securely, highly sensitive data for the ministry in order for them to precisely see groundwater levels and allocate valuable resources accordingly. The installation took place in a small hut, it was extremely warm and the walls were covered with climbing lizards. Thankfully the installation went quickly as everyone was very keen to get involved and help out wherever they could. In addition to the installation we also delivered a training session on how to operate the system, troubleshoot and interpret & manipulate the data. Our *vanwalt*CONNECT interface is very user friendly so training Nahid and her colleagues was pretty straightforward and went without a hitch, even with the language barrier. We went over how to download the data, how to produce interactive reports covering water levels and temperature, how to zoom in and out of data periods to compare different data sets and set alarms at predetermined levels to warn the appropriate authorities if levels became critical.

The following day we travelled to a local village where we installed a water level logger for brackish conditions in a drinking water well, this was to make sure the villagers had an adequate and safe water supply. This was probably the most interesting well I have ever come across as there were several sticks, stones and even toys down the well from children playing games. People travelled from all over to collect water from this well; they would fill an assortment of containers, anything they had to hand, with water. After queuing for their turn to extract this precious resource they would carry it on their heads, on donkeys or encourage the children to collect and carry this precious resource home. It really makes you appreciate what you have at home.

It wasn't all work; Vincent and I visited the oldest pyramids in Sudan, dating back to 4000 BC and experienced traditional Sudanese cuisine and the Sudanese markets. Vincent & I are planning on returning to Sudan in early 2016 to see how everything is going, we plan to expand our *vanwalt*CONNECT systems and provide additional training.

In Sudan I met so many interesting people; everyone was amazingly kind and generous and I will always have fond memories of sitting by the Nile, drinking tea and watching the sun set.