A SENSOR OBSERVATION SERVICE CLIENT TO RECEIVE ENVIRONMENTAL CONDITIONS ON ANDROID MOBILE PHONES

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1 Background

According to the latest Intergovernmental Panel on Climate Change (IPCC) report, extreme climate events will increase and will likely influence our living environment, including the groundwater. To understand and to adapt to these impacts, a real-time Wireless Sensor Network (WSN) has been setup. This poster demonstrates a mobile Android application (app) connecting to the Open Geospatial Consortium (OGC) standard Sensor Observation Service (SOS). In the context of the SMART Aquifer Characterization Program (SAC) this app retrieves near real-time climate, hydrology and soil sensor data from multiple sensors in an open interoperable way.

Keywords
Mobile Device, OGC, Open Source, Standard, SOS, Wireless Sensor Network

2 Challenges

The challenge is the Android app client accessing a SOS server for visualising climate data in real-time. The measurements should depict latest results in table form and as time series as charts. Since the reduced processing capacity of mobile phones, a fast working app is the main challenge to ensure customers not spending their time in waiting for request answers.

3 Objectives

The short term objective is an immediate access to present environmental conditions and the course of previous measurements. In medium term the in situ measurement triggers messages to users via a Sensor Event Service. This Early Warning System should inform local stakeholders in critical environmental conditions to ensure pro-active rather than reactive adaptation actions.

4 Methodology, data used and case study area

The SOS provides three core methods (Fig. 1), the GetCapabilities, DescribeSensor and GetObservation method (OGC 2012). The description of the methods are according to Bröring et al. (2012). GetCapabilities: Provides access to metadata and detailed information about all available operations and accessible sensors. DescribeSensor: Metadata description of the requested procedure resp. sensor, provided in the former GetCapabilities document. GetObservation: Takes the information of the GetCapabilites and DescribeSensor document to perform the observation data request.

Because used sensors within the SAC project are known only the GetObservation method is used to access the sensor values provided by the SOS server within the programming code (Fig. 2).

The environmental information comes from a climate station in Koppl (Fig. 3), a municipality close to Salzburg, Austria (Klug and Kmoch 2014) but can be adapted to any other location, too.

Fig. 1 – Default SOS request (OGC 2012, customized)

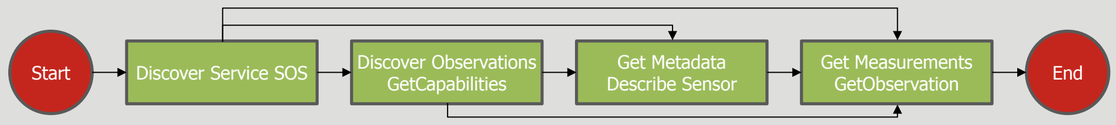


Fig. 2 – Adapted SOS request (OGC 2012, customized)

Fig. 4 – Android app sensor data, table view, latest result

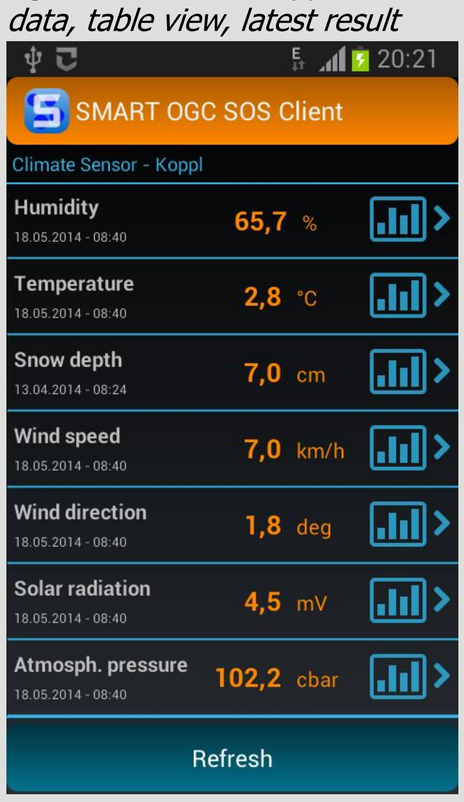


Fig. 3 – Climate stations in Koppl, Austria

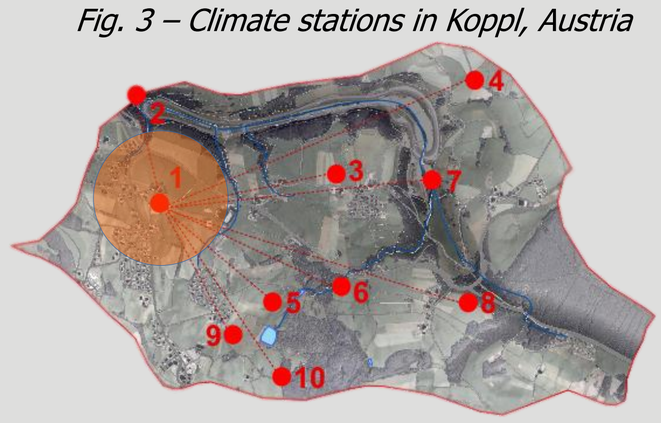
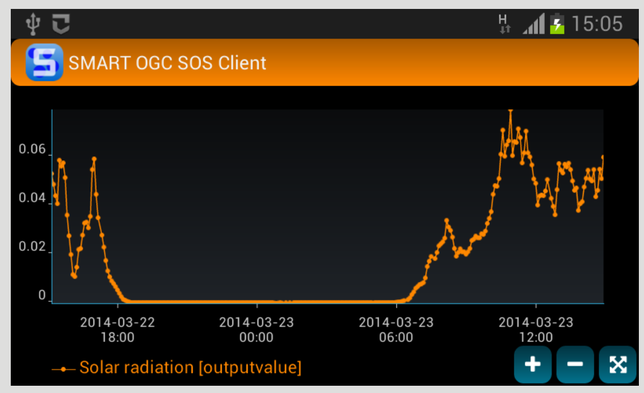


Fig. 5 – Android app sensor data, chart view, time series



5 Results

The results are the visualised sensor values from the SOS server displayed as table and chart (Fig. 4). The table shows the latest measured values whereas the chart can be used to highlight time series. The user can choose the number of dates of the time series to be visualised.

Given the standard compliant, interoperable and platform independent development the implemented sensors can be easily adapted. Additional environmental sensors and their measurements can be inserted, thus, the app is adoptable for any hydro-climate stations based on the SOS standard.

6 Discussion and Outlook

A reliable and fast working mobile client app with access to a SOS server to retrieve near real-time sensor data has been established. Further possible enhancements are the embedding of additional climate stations, writing georeferenced field measurements from the device to the server for improvement, adjustment or supplemental reasons and the achievement of a Sensor Event Service (SES) for reacting and decision making in the context of an Early Warning System.

Literature

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