

EGU21-12468

<https://doi.org/10.5194/egusphere-egu21-12468>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



4onse project results: quality and costs evaluation of an open and low-cost monitoring network of 30 stations in Sri Lanka

Daniele Strigaro¹, Massimiliano Cannata¹, Rangajeewa Ratnayake², Bh Sudantha², and Imran Sahid³

¹SUPSI, Istituto scienze della Terra, DACD, Canobbio, Switzerland (daniele.strigaro@supsi.ch)

²University of Moratuwa, Katubedda, Moratuwa, Sri Lanka

³Qatar University, Doha, Qatar

The 4onse project (Four times Open Non-conventional system for Sensing the Environment) was born by the collaboration between SUPSI and two universities in developing countries namely the University of Moratuwa in Sri Lanka and the Institute of Space Technologies in Pakistan. The activities led to the installation of more than 30 stations in the Deduru Oya basin in Sri Lanka, following the development and testing of a prototype. The rise of technologies for Smart City and the Internet of Things (IoT) makes this project of interest to both the scientific and the private world, also considering the growing concern for environmental and climate issues.

The environmental monitoring system has been designed and developed on the wave of openness, which increasingly pervades not only scientific activity, but also the commercial sectors at different levels. Based on this philosophy, the selected hardware and software technologies have been evaluated in terms of quality, durability and sustainability and are showing very promising results. Unlike conventional systems, where the adoption of closed solutions strongly limits interoperability and data sharing, the designed solution is characterized by a high reproducibility and interoperability, guaranteed by the adoption of open software and standards for the collection and distribution of data. Such a technology can be applied and further developed for monitoring natural and non-natural environments that require low-cost sensor components with a level of quality comparable to conventional systems commonly used. This cost-effective solution is a possible alternative for the implementation of sensor networks in particular in low-income or developing countries in order to manage natural risks or water resources.

The solution consists of three different layers: hardware, server and communication layer. The hardware layer consists of a weather station based on Arduino and sensors measuring environmental variables. This kind of prototype has been validated thanks to the comparison of the time series with the data of an official weather station of the hydro-meteorological network of the Canton Ticino. The second layer is characterized by the server infrastructure that stores the measured data using the istSOS database management system (DBMS), which makes them accessible thanks to the implementation of open standards such as the Sensor Observation Service (SOS) of the Open Geospatial Consortium (OGC). Finally, the communication layer concerns

the use of GPRS for the transmission of data from the node to the server that has been optimized in terms of energy and bandwidth consumption in order to guarantee stable and fast communication.

The research project has reached the end of the activities and during this presentation the main results and outputs will be presented.