



Detection and understanding of water quality deviation events in the drinking water supply network of the Poblenou Sector (Barcelona), Spain

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Monitoring critical drinking water points in the water distribution system of Barcelona (Catalonia, Spain) is an increasing concern. The control of several quality parameters as free chlorine, total organic carbon (TOC), conductivity, turbidity, temperature, colour, pressure and flow are necessary to ensure a supply of safe and clean drinking water to consumers.

The aim of this project is to investigate the consequences of alterations detected in the water distribution system, to find the focus of occurrences and controlling them to provide a better drinking water quality to Barcelona citizens.

Barcelona procures drinking water to its citizens via two main water sources: Ter and Llobregat Rivers. They have intrinsic quality differences and they must be treated in different ways. With the purpose of controlling and investigating how these differences impact the water quality supplies, two scan sensor systems were installed in the Poblenou District (Barcelona). The first one (nanostation) was installed in a drinking water distribution pipe, and the second one (pipescan) was installed in a domestic water supply network. Both systems were situated in the same drinking water confluence sector in order to compare the data recorded and to visualise water quality changes. More than 20 events were recorded, analysed and classified according to whether the alteration was due to an occasional event in the domestic water supply or to an external incident from the water distribution system. Some detected events were related to an increase of temperature, a rise of water demand, the water origins or changes in pressure.

One important event recorded by the installed probes was an increase of temperature, directly associated with an augment of total organic matter (TOC) at the beginning of summer (June 2018). A great rise of TOC would be the causer of high consumption of free chlorine that it could be hazardous for human health if there is not enough chlorine dissolved in water. Due to this temperature increment (from 15°C to 23°C in a few days), the minimum level of chlorine (less than

0.2 mg/L) was registered in the Poblenou Sector.

Nano::station and pipe::scan sensor systems are excellent tools as on-line water quality controllers. These kinds of sensors can record variations occurring every two minutes, giving a great perception of the events that are happening at different points of the drinking water city-wide network.