



An Internet of Things (IoT) application on volcano monitoring

Shadia Awadallah-Estévez (1), Ángel David Moure-García (1), Pedro Torres-González (1), and Víctor Villasante-Marcos (2)

(1) Centro Geofísico de Canarias, Instituto Geográfico Nacional. Santa Cruz de Tenerife, Spain, (2) Observatorio Geofísico Central, Instituto Geográfico Nacional. Madrid, Spain

Volcanic eruptions are violent phenomena that can significantly affect populations in its immediate surroundings and those located at greater distances. These natural phenomena are usually preceded by a reactivation phase in which measurable variations in some parameters such as an increase in seismicity, ground deformation, increase in gaseous emissions or variations in the temperature of the fumaroles, can occur. So, in order to reduce the volcanic risk, a properly volcanic monitoring is needed.

However, volcanic areas are usually remote and inaccessible, offering high difficulties for communications and power supply of permanent surveillance equipment. Therefore, it is necessary to design low power consumption systems with long-range communications. These two requirements are fulfilled by a new technology, the Internet of Things (IoT), which is becoming important in the last years. The IoT enables any item with embedded electronics to connect and exchange data over a network. To achieve this purpose, a lot of new network protocols and devices have been deployed.

In this work, we propose a wireless network of thermometers to measure the soil temperature in volcanic areas based on the IoT technologies. The thermometer is composed of an Arduino Pro Mini and a MAX31865 module with a resistance thermometer detector (PT100). To transmit the data we use a Lora module, which allows us to set up a LoraWan network and take advantage of its low power and long range capabilities. These units can be powered directly by a 3.7V lithium battery for several months.