



Development of a multi-parameter system for Antarctic researching

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This work describes the development of a multi-parameter system for antarctic researching. The system permits the remote access and the connection of several modules in a network. An embedded ARM processor has been used, allowing a great flexibility in hardware configuration. The advantage of the system presented in this work is that it allows the rapid development of a monitoring network that uses the latest technologies of embedded systems. These embedded systems offer the possibility of developing the software necessary for managing the sensors and instruments available. Data can be transmitted in near real time or on demand to a Data Reception Center (DRC). The local storage allows retrieving data when the transmission fails and uses only short transmission periods rather than continuous transmission. The price of both hardware and software is very low. The use of a complete Linux solution (Debian) as Operating System permits a quick, easy application development to control sensors and communications. This provides all the capabilities required and great stability with relatively low energy consumption. The cost of the components and applications development is low since they are widely used in different fields. Sensors and commercial modules have been combined with other self-developed modules. The Modular System described has been deployed at Deception Island (Antarctica), within the Spanish Antarctic Program, and has proved successful for monitoring and researching the geodinamical activity, with proven reliability and efficient operation under extreme conditions. Deception Island is an active volcano with some geothermal areas, this fact has allowed to develop a power system using Peltier cells. In another context, i.e. the recent volcanic activity on El Hierro Island (Canary Islands) in 2011, this technology has been used for the seismic equipment and GPS systems deployed, thus showing its efficiency in the monitoring of a volcanic crisis.