A framework for cross-observatory volcanological database management

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In the last years, it has been clearly shown how the multiparametric approach is the winning strategy to investigate the complex dynamics of the volcanic systems. This involves the use of different sensor networks, each one dedicated to the acquisition of particular data useful for research and monitoring.

The increasing interest devoted to the study of volcanological phenomena led the constitution of different research organizations or observatories, also relative to the same volcanoes, which acquire large amounts of data from sensor networks for the multiparametric monitoring.

At INGV we developed a framework, hereinafter called TSDSystem (Time Series Database System), which allows to acquire data streams from several geophysical and geochemical permanent sensor networks (also represented by different data sources such as ASCII, ODBC, URL etc.), located on the main volcanic areas of Southern Italy, and relate them within a relational database management system. Furthermore, spatial data related to different dataset are managed using a GIS module for sharing and visualization purpose. The standardization provides the ability to perform operations, such as query and visualization, of many measures synchronizing them using a common space and time scale.

In order to share data between INGV observatories, and also with Civil Protection, whose activity is related on the same volcanic districts, we designed a "Master View" system that, starting from the implementation of a number of instances of the TSDSystem framework (one for each observatory), makes possible the joint interrogation of data, both temporal and spatial, on instances located in different observatories, through the use of web services technology (RESTful, SOAP). Similarly, it provides metadata for equipment using standard schemas (such as FDSN StationXML). The "Master View" is also responsible for managing the data policy through a "who owns what" system, which allows you to associate viewing/download of spatial or time intervals to particular users or groups.