



Continuous geochemical monitoring of underground water at Stromboli Volcano, Italy

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Stromboli volcano is known worldwide for its persistent activity and for this reason has been studied for many years (seismicity, gas geochemistry,...). However dense monitoring networks have been installed only recently (December 2002), when a well alimented lava flow triggered a large landslide of a submarine and subaerial portion of the NW flank of the Volcano (Sciara del Fuoco).

Following the December 2002 eruption a new developed station for automatic geochemical analysis of underground water was installed on Stromboli Volcano (Fulco well) and operated for a four-month-long period (February, 4 - April 10, 2003). The station provides continuous measurements of the chemical and physical parameters of underground water and the amount of dissolved gases (CO₂ and CH₄). Volcanic activity during this period departed from the normal strombolian activity but was characterized by a well sustained lava flow and the absence of the typical strombolian activity from the summit craters. This was interrupted by the strong paroxysmal explosion of April 5, 2003. Geochemical data from the new continuous station showed: a) periodical variations (main period of 12 hours) related to the main sea tide fluctuations, b) strong changes over longer-lasting time periods (up to several days). Among them a net increase in temperature and amount of dissolved CO₂ together with a decrease of pH preceded the April 5, 2003 paroxysmal explosion.

Starting October 13, 2003 the station has been installed in a different well on the island of Stromboli (Limoneto well) and has been operating during the period of typical strombolian activity which followed the end of effusive phase. Fluctuations of the water table during the summer period caused frequent damages of the pump, resulting in a discontinuous data set. Geochemical data showed again periodic fluctuations of

water conductivity, temperature, pH and dissolved CO₂ in accordance to sea tides. However there was no evidence for different types of variation related, as for the previous analysis (Fulco well), to volcanic activity.