



Preliminary results of continuous gas geochemical monitoring at Solfatara volcano (Campi Flegrei) southern Italy

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While continuous geophysical monitoring have become widely accepted as major tools for volcanological forecasting, geochemical surveillance of volcanic activity is still less frequently applied. Investigations on the chemistry and mineralogy of fumaroles gas and sublimates as well as isotopic investigations of volcanic gas sampled at Solfatara volcano (Campi Flegrei southern Italy) were performed using various methodologies prevailing on monthly/weekly basis since the bradisismic crisis 1983-84. This scattered gas chemical investigations gave important information on the behavior of the Solfatara volcano system but did not record systematic short term gas variation or interdependency of the gases with time. This makes difficult to correlate gas composition data with magma motion, eruptive events or geophysical parameters such as seismicity, tilt, strain. For this reason, it was, therefore, necessary to develop a new technique for the continuous geochemical monitoring of the volcanic gas. The main objective of our investigations was to set up a continuously-operating gas monitoring station equipped with a diode-laser based apparatus (H_2O - CO_2 concentrations and $\delta^{13}\text{C}$ of CO_2 composition) a quadrupole (amu 1-100) mass spectrometer coupled with an appropriate heating line to prevent any gas condensation before the injection into the analyzing chamber. These mass spectrometric analysis performed at

the Solfatara volcano will be important for the evaluation of the gas oscillation phenomenon. Further the highly corrosive prohibitive condition and maintenance needed by these sophisticated instruments will be a key to develop in the near future more simple and less expensive devices based on various sensor technique and innovative material to be installed at the Solfatara volcano in order to allow local authorities and scientists to better understand how volcanoes work.