Geophysical Research Abstracts
Vol. 16, EGU2014-14526, 2014
EGU General Assembly 2014

Insights into different Strombolian explosive styles by remote controlled OP-FTIR (CERBERUS) measurements

La Spina Alessandro (1), Burton Mike (2), Murè Filippo (1), and Maugeri Roberto (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Italy (alessandro.laspina@ct.ingv.it), (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Italy

In this paper we present the results and interpretation of gas composition data collected by a permanent OP-FTIR system (CERBERUS) installed at Stromboli summit. The instrument allows remote control observation and measurement of gas emissions from different points within volcano's crater terrace, using an integrated infrared camera / scanning mirror / FTIR system. Given that an OpenPath Fourier Transform InfraRed (FTIR) spectrometer allows the simultaneously measure all the major species contained in volcanic gas emissions, we could observe the different explosive styles fed by Stromboli volcano.
Stromboli volcano, in the Aeolian island arc, is known as the "Lighthouse of the Mediterranean" for its regular (∼every 10–20 min) explosive activity, launching crystal-rich black scoriae to 100–200 m height constituting a rich and impressive spectacle for both volcanologists and tourists from every part of the world. This ordinary activity has been classified in two types in relation to the their content of ash ejected. Type 1 is dominated melt ballistic particles whereas Type 2 consists of an ash-rich plume. On 18 July we recorded both explosive styles at the SW crater of Stromboli finding
quite similar CO_2/SO_2 ratio, although we observed a higher value of SO_2/HCl molar ratio for the Type 2. Moreover prior to both types of explosions the CO_2 amount showed similar trend, whereas a different pattern in SO_2 and in HCl gas content, was observed. In detail type 2 was preceded by decrease in SO_2 and HCl amounts with respect to type 1. The decreasing trend observed before the onset of style 2 and the higher SO_2/HCl ratio might be an indication of overpressure that might have induced the difference between the two types of explosions. In this context, the evidence of no change in the amount of CO_2 and in CO_2/SO_2 ratio suggested us that this overpressure occurred in very shallow depths within the volcano feeding system. If our observations will be confirmed by other explosive event data, we will be able featuring the different source conditions triggering the ordinary explosive activity at Stromboli.