



The bilateral 2002/03 eruptive event at Mt. Etna: a link between NE and S Rift Systems

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The 2002/2003 eruptive event lasted from the 26th of October 2002 to the 28th of January 2003 and involved contemporaneously both North East and South Rift Systems (NERS and SRS, respectively). A stratigraphically controlled sampling of lava flows and tephra emitted along the SRS, from 2900 to 1700 meters a.s.l., was developed. Whole rock major and trace element analyses were carried out on these samples and results were compared with those obtained from the NERS (Ferlito et al., 2009). The entire eruption was divided in 8 stages of activity, from T2 to T5 on the north flank of the volcano, and from T5 to T8 on the southern one. Volcanic activity started at T1 on the southern flank, but products are no longer accessible for sampling.

SRS products are High-K porphyritic magmas (HKP; Ferlito et al., 2009) analogous to those emitted at T5 on the lowest segment of NERS. Quartzarenitic xenoliths are found in lavas from both sides of the volcano.

Major and trace element mass balance and Rayleigh fractionation modelling suggest that HKP magmas emitted on both the South and North East Rift depict a common fractionation trend, with lavas from the southern flank being more primitive. Moreover a detailed textural and petrological study of plagioclase indicates that chemical-physical conditions of the deepest part of the feeding system were analogous and that lavas evolve differently on the NE and the South Rift systems at shallow levels.

These new geochemical and mineralogical data, together with published seismotectonic data, support the idea that the main magma feeding the eruption was common on both sides of the volcano even though magma ascent probably occurred through the South Rift fractures and was intercepted from the NE Rift system only at relatively shallow depth.

At SRS eruptions, which lasted until the end of January, were fed by new magma inputs, as also suggested by the petrological features of the stratigraphically-controlled samples. On NERS eruptions, which lasted for only few days, was passively triggered by tectonic activity.

Ferlito C, Coltorti M, Cristofolini R, Giacomoni P P (2009) The contemporaneous emission of low-K and high-K trachybasalts and the role of the NE rift during the 2002 eruptive event, Mt. Etna, Italy. *Bull Vulcanol* 67 (4): 314-330