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Degassing and thermal release relationship as a marker of anomalous activity on Stromboli (Italy)

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For 2500 years, the typical activity of the Stromboli volcano (Aeolian Islands, Italy) has been characterised by regular small explosions (strombolian activity), which once or twice per year reach paroxystic levels. On 28 December 2002 a new effusive eruption started and continued until 21 July 2003. In May 2002 it was preceded by an increase in the intensity of strombolian activity and by a heightening of the magma level within the main conduit. In early December, both the intensity and the frequency of the explosions continued to increase, until the opening of a NE-SW eruptive fissure and the beginning of the effusive eruption on the afternoon of 28 December. After the onset of the 2002-03 Stromboli flank eruption, strombolian activity at the summit craters stopped. On 5 April a paroxysmal event occurred. This major explosion marked the decline of the effusive activity and the reopening of the summit crater conduits. Only on 1 June after seven months of effusion, did strombolian activity gradually resume becoming stable on 21 July after the cessation of the eruption. The 2002-2003 Stromboli eruption was a great opportunity to better our understanding of the connection between strombolian and effusive activity in relation to the feeder conduit processes. Here we describe the event through the correlation between COSPEC SO2 flux measurements and FLIR thermal measurements carried out on the summit craters. The relationship between these data sets suggests three different stages of eruptive activity, and provide evidence of the fundamental role of 5 April paroxysmal explosion as a trigger for the re-establishment of typical strombolian activity at the summit craters. We also show how the relationship between SO2 degassing and thermal release may play a prominent role in volcanic hazard assessment as a signal of anomalous activity

at Stromboli.