Mapping of 2002-2003 lava flow eruption of Stromboli and simulation of the post- 15 February 2003 eruptive phase

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By measuring the geometry of the flow fields, such area, thickness and volume, it is possible to quantify effusion activity during or after an eruption, provided that the corresponding pre-eruption data are available. If the evolution of the lava flows is known at adequately spaced epochs, effusion rate trend can also be extracted by extrapolating average values obtained for each time interval. These data coupled with the corresponding updated topography can be adopted to perform lava emplacement simulation tests. During the 2002-2003 eruption at Stromboli the performance of repeated photogrammetry surveys provided useful data for measuring the volumes of erupted lava flows and for extrapolating a reliable effusion rate trend for the whole eruption. The geometry of the lava flow fields was defined by means of a joint analysis of digital ortophotos and residual maps and validated by daily aerial and field mapping. The eruption started on the 28th December 2002. Effusion activity continued expanding lava flows on the Sciara del Fuoco from scattered vents initially located at about 500 m elevation. On 15th of February these vents became inactive and a new stable vent opened at about 600 m. The new vent remained active until the end of the eruption forming a 50 m thick lava pile. Effusion rate decreased in June and completely stopped between 21 and 22 July. Preliminary results obtained from the simulation of the lava emplacement during this eruptive phase are presented and discussed.