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The July/August 2019 eruption phase at Stromboli – analyzed by multi-sensor infrared satellite imagery

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On July 3, 2019 a rapid sequence of paroxysmal explosions at the summit craters of Stromboli (Aeolian-Islands, Italy) occurred, followed by a period of intense Strombolian and effusive activity in July, and continuing until the end of August 2019. We present a joint analysis of multi-sensor infrared satellite imagery to investigate this eruption episode. Data from the Spinning Enhanced Visible and InfraRed Imager (SEVIRI) was used in combination with those from the Multispectral Instrument (MSI), the Operational Land Imager (OLI), the Advanced Very High Resolution Radiometer (AVHRR), and the Visible Infrared Imaging Radiometer Suite (VIIRS). The analysis of infrared SEVIRI data allowed us to detect eruption onset and to investigate short-term variations of thermal volcanic activity, providing information in agreement with that inferred by night-time AVHRR observations. By using Sentinel-2 MSI and Landsat-8 OLI imagery, we better localized the active lava-flows. The latter were quantitatively characterized using infrared VIIRS data, estimating an erupted lava volume of 6.33 ± 3.17 million m^3 and a mean output rate of 1.26 ± 0.63 m^3/s for the July/August 2019 eruption period. The estimated mean output rate was higher than the ones in the 2002–2003 and 2014 Stromboli effusive eruptions, but was lower than in the 2007 eruption. These results confirmed that a multi-sensor approach might provide a relevant contribution to investigate, monitor and characterize thermal volcanic activity in high-risk areas.

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