

Hazardous emission of volcanic gases in the touristic site of Levante Beach (Vulcano island, Italy)

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Since the 1888-1890 La Fossa eruption, Vulcano remained quiescent with only intense fumarolic activity. The main fumaroles are concentrated in La Fossa crater and at Levante Beach. These areas are characterized also by an extensive soil CO₂ degassing. Episodic “crises” occur at La Fossa with increase of temperature, gas output and concentration of magmatic components in fumaroles. During the 1988-1993 crisis, the accumulation of CO₂ in morphological depressions provoked the death of two children at Vulcano Porto and of many small animals at the base of the active cone. In April 2015, a child lost his senses while playing near a fumarole at Levante Beach; he was rescued to the hospital and doctors attributed his malaise to a high CO₂ air concentration. In summer 2015 we performed geochemical surveys on the Levante Beach sector (onshore and offshore) including the mud pool. The total gas flux was 1 t/day of CO₂ and 16.1 kg/day of H₂S from 0.3 km². In the mud pool area, CO₂ and H₂S air concentrations were continuously measured for a week. The [CO₂] was frequently higher than in unpolluted air. [H₂S] displayed high values (max 43 ppm), frequently exceeding TWA (10 ppm) and STEL (15 ppm) thresholds. Offshore, gas concentration in atmosphere over the submarine vents displayed extremely high H₂S (up to 1000 ppm) and CO₂ (8.6 vol.%) values. In summer 2016 a new survey was performed at Levante Beach repeating the same gas flux and concentration measurements of 2015. Results confirm the occurrence of high air gas concentration values, particularly of H₂S, near the onshore and offshore fumaroles and at the mud pool. These results indicate the persistence of a serious gas hazard for people in this highly frequented touristic side of Vulcano, even in periods without any sign of volcanic unrest.