



The geochemical continuous monitoring network of Vulcano Island (Italy): Long-time variations of SO₂ and CO₂ fluxes

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Vulcano Island, located in the Aeolian Archipelago, is an active volcano that has been in state of solphataric activity, since the last eruption (1888-1890). At present, the main exhalative activity is in the northern part of the island, it is revealed by a wide fumaroles field, on the active edifice of “La Fossa” crater, (100°C <450°C).

As part of the volcanic monitoring programs, the extensive parameters have a determining role in the evaluation of the mass-output involved. For this reason, in the last years the Vulcano continuous monitoring network was implemented with equipments to measure the fluxes of SO₂ “plume” and CO₂ soil emitted from the summit crater. In particular, in the 2007 a station to measure the soil CO₂ degassing (VCS) was installed in the summit area outside of the fumarolic field. Moreover, inside of the NOVAC project program, an UV-scanning DOAS was installed in the Palizzi area to measure the total SO₂ flux emitted from the entire degassing crater area.

Here we present the long time variations recorded in the 2007-2014 period. The CO₂ soil degassing showed an average flux of 1600 ± 250 g m⁻² d⁻¹ representing the background value during “normal” solphataric activity at the permanent station. In the investigated period anomalous values up to 16,000 g m⁻² d⁻¹ was recorded in the last months of 2009.

The SO₂ “plume” degassing showed an average flux of 12 t d⁻¹ with an anomalous degassing process also recorded at the end of 2009 with values up to 100 t d⁻¹. Moreover, a slight increasing trend of SO₂ fluxes was recorded in the last years. In the monitoring of active volcanoes, the recorded contemporaneous variations of independent geochemical parameters highlights the importance of the extensive parameters, able to provide information about deeper changes driving the solphataric activity.