



A diode-laser-based spectrometer for continuous in situ measurements of volcanic gases (CO₂, H₂O) concentration and soil degassing at Vulcano (Aeolian islands: Italy).

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We report the data obtained during a continuous measurements survey carried out at Vulcano (Aeolian islands-Sicily, Italy) and devoted to the simultaneous monitoring of CO₂ and H₂O gas concentrations and flux from the soil. The measurements were performed using a laser spectrometer based on a semiconductor laser source emitting around 2 μm . The emitted radiation was selectively absorbed by two molecular ro-vibrational transition specific of each of the investigated species. The measurement campaign was held in August 25-29th, 2004. During the campaign the emissions at different sites: the beach of “Porto Levante”, the valley downhill the crater “Palizzi” and the “Cratere Fossa Grande” were analysed. The gas concentration of CO₂ and H₂O at “Porto Levante” range from 1,500 ppm to 450 ppm and from 51,700 ppm to 34,500 ppm respectively varying the geometry of the spectrometer configuration from ground level to 1,30 m height. The valley site and “Cratere Fossa Grande” show in average a slight change in CO₂ and H₂O concentrations ranging from 384 ppm to 564 ppm and from 35,200 ppm to 23,130 ppm respectively. Further, the flux rate of CO₂ at the different sampling sites ranges from 0.00172 s⁻¹ up to 0.00306 s⁻¹. The large amount of experimental data collected under different operational conditions during continuous in-situ efflux analyses have demonstrated that the concentration of CO₂ and H₂O, in contrast to traditional discrete gas monitoring of fumaroles, changes relatively rapidly. Thus, the continuous gas monitoring would allow us to detect an

oscillation of CO₂ concentration, probably due to a pulsing release from a magmatic gases source.