



The contrasting effects of earthquake-induced permeability increase and of permeability reduction by hydrothermal self-sealing: a possible clue to explain CO₂ flux time variation recorded at Colli Albani, Rome

M.L. Carapezza (1) F.R. Roscioni (2) L. Tarchini (1,2)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Sezione Roma 1, Rome, Italy, (2)
Dipartimento di Scienze geologiche, Università ROMA TRE, Rome, Italy (carapezza@ingv.it
/ tel: +390651860370)

systematic CO₂ soil flux surveys on a fixed grid over 0.6 hectares, carried out at cava dei Selci, one of the main gas manifestations of Colli Albani volcano (28 seasonal surveys since the year 2000), have shown a significant variation of CO₂ diffuse release, with a marked decrease, from 25 to 4 tons/day, from May 2000 to August 2004, followed by a new increase (11.4 tons/day in October 2006). In the same time CO₂ flux halved in the most degassing siter of S. Maria delle Mole (5.4 hectares: 16.8 tons/day in 2000 and 8.3 tons/day in 2006) and also the totl quantity of CO₂ dissolved in the deep waters of the Albano crater lake decreased of one order of magnitude in the period 1997-2006. the high CO₂ flux values could represent the “tail” of a strong degassing episode recorded at Colli Albani in 1995 and related to local earthquakes. The following decrease of CO₂ release could reflect a permeability decrease caused by hydrothermal calcite precipitation favoured by PCO₂ reduction in the deep source. As the reservoir cover becomes less permeable, PCO₂ reincreases generating a new CO₂ flux increase through the leaking structures