



Monitoring the geothermal fluid using time lapse electrical resistivity tomography: The Pisciarelli fumarolic field test site (Campi Flegrei, South Italy)

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Pisciarelli area is a fumarolic field subject to very short time morphological changes. A number of critical problems affect this area, i.e. increase of temperature of the fumaroles above the average background temperature, local seismicity and occurrence of fumaroles mixed with jets of boiling water. The presence of a very shallow aquifer seem to have the control on the behavior and composition of the fumaroles. This fumarolic field is still largely unknown regarding geophysical surveys mainly because of its limited space, surrounded on the eastern side by intense urbanization inside the large Agnano crater (Troiano et al. 2014). Currently is mainly affected by geochemical, thermal and seismic monitoring which may not fully explain the behaviour of fluids surface. Many monitoring or time lapse (TL) applications are discussed in literature (e.g., White, 1994; Daily et al., 1995; Barker and Moore, 1998; Ramirez and Daily, 2001; Carter, 2002; Slater et al., 2002; Singha and Gorelick, 2005; Cassiani et al., 2006; Swarzenski et al., 2006; de Franco et al., 2009). However all these experiments are devoted to the use of the ERT for tracer tests or in contaminant hydrology and are characterized by a short monitoring period due to the complexity and problems of long-time instrument maintenance. We propose and present a first approach of a geophysical monitoring by time lapse electrical resistivity in a fumarolic field. The profiles were acquired in January 2013, in January, March, May, July, September and November 2014 respectively. They cross the Pisciarelli area following approximately the NS direction and were characterized by a 2.5 m electrode spacing and maximum penetration depth of about 20 m. and will supply fundamental evidences on the possible seasonal resistivity fluctuations or if the resistivity changes are indicative of an increase in volcanic gases present in the hydrothermal system.