VESUVIUS - ACOUSTIC EMISSIONS, DEFORMATION, SEISMICITY - AN INFLATING AND DEFLATING SYSTEM BY A TIME VARYING HOT FLUID PRESSURE

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Acoustic Emissions (AE) allow for clear assessment of the times when AE sources appear 3D distributed in space, envisaging a likely origin by hot fluid diffusion through rock pores, in contrast to times when AE sources denote some more 2D than mere 3D spatial distribution, envisaging an origin by micro-cracks, much like e.g. along a cleavage plane of a crystal. Hence, the AE recorded on a dyke of a volcano recognize the role of hot fluids (having great mobility underground) compared to the role of plutonic intrusions (producing cracks, due to the extremely low mobility of magma underground). AE provide per se with a high sensitivity and time resolution, and recognise inflation and deflation times. AE ought to be correlated with soil degassing and topographical micro-deformations. In contrast, seismic monitoring has a much lower time resolution, as it is concerned with time- and energy-integrated effects, which appear likely to be triggered by the weight of the edifice. Vesuvius is a good test case history. The state of the art is reported about correlation studies between AE, precision topography, and seismicity.