

THE CAMPI FLEGREI DEEP DRILLING PROJECT 'CFDDP': UNDERSTANDING THE MAGMA-WATER INTERACTION AT LARGE COLLAPSE CALDERAS

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Campi Flegrei caldera is a good example of the most explosive volcanism on the Earth, a potential source of global catastrophes. Alike several similar volcanic areas (Yellowstone and Long Valley, USA; Santorini, Greece; Iwo Jima, Japan, etc.) its volcanic activity, i.e. eruptions and unrests, is dominated by physical mechanisms involving the strict interaction between shallow magma sources and geothermal systems. Furthermore, just like similar areas, it should be characterised by very large shallow magma chambers, filled by residual magma left after the ignimbritic caldera forming eruptions. However, neither the physical mechanisms of magma-water interaction, nor the evidence for such large magma chamber, have been yet clear enough to be used for detailed volcanological interpretation and eruption forecast. Campi Flegrei caldera, with respect to many similar area, has the advantage that the most interesting structural details and main volcanic features appear located at shallower depth, making it a natural candidate for a deep drilling project aimed to understand the volcanic structure of calderas. The CFDDP project, sponsored by ICDP (International Continental Drilling Program), aims to understand, for the first time, the location and reology of large residual magma chambers and the mechanisms of interaction between magma and aquifer systems to generate eruptions and unrests ay large collapse calderas. CFDDP is then structured as a large multidisciplinary project, with the main goal of volcanic risk understanding and mitigation, and a further goal to launch geothermal energy exploitation at this and other volcanic areas of Italy. A broader goal of the CFDDP project is to establish at Campi Flegrei, a densely urbanised area in a developed western country, a natural laboratory to study volcanic risk, environmental and technology issues, geothermal energy exploitation.

CFDDP is then a multi-purpose, multidisciplinary project involving cooperation of several international Institutions. Because of its complexity and the involvement of drilling activities and logistic solutions, besides a reliable scientific planning it also required optimal solutions to several administrative and communication problems, generally out of the routine activities of a public research Institution. For these reason, new experience has been gained by the involved Institutions about administrative, normative and logistic solutions, which can be highly valuable for the Italian geophysical community to plan and manage future, large multi-disciplinary projects.