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The Campi Flegrei Deep Drilling Project 'CFDDP': understanding the magma-aquifers interaction at large 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 ever 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 aims to understand, for the first time, the location and rehology of large residual magma chambers and the mechanisms of interaction between magma and aquifer systems to generate eruptions and unrests. CFDDP is then structured as a large multidisciplinary project, with a main volcanological aim and with a further goal to launch geothermal energy exploitation in the area and in 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.