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Drilling through an active caldera for geohazard purpose (CAFE Project). Offshore Campi Flegrei, eastern Tyrrhenian margin

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Active calderas are major volcanic features of the Earth’s crust associated with shallow magma reservoir, high geothermal gradient, and geodynamic unrest often documented through historical time. As large caldera forming explosive eruptions are also among the most catastrophic geologic events that may affect the Earth’s surface, calderas are ostensibly the sites of major interest for both the scientific community and governmental institutions worldwide. The Campi Flegrei (i.e. “burning plain") is an active volcanic complex that lies west of the town of Naples nearby the Pozzuoli bay coastline. This area represents a very mobile segment of the eastern Tyrrhenian margin during the late Quaternary and may be regarded as a privileged natural laboratory to study the interplay between tectonics and volcanism associated with rifted back-arc volcanic margins. Most authors agree in considering the Pozzuoli bay and its surroundings as a remnant of a quasi-circular caldera, about 13 km in diameter. The caldera formed as a consequence of a major eruption and collapse that occurred about 37 ky BP, and caused the emission of some 80 km3 of magma and the emplacement of ignimbrite sheets all over the present-day Naples region. A co-ignimbritic air-fall layer (Y5) related to that eruption and extending as far as the eastern Mediterranean and north-eastern Europe, has been detected. After this gigantic event many large to medium scale eruptions occurred at around 15 ky BP and in the past 6000 years. The most recent volcanic activity occurred in 1538 A.C. Magma-related activity clustered in the centre of the caldera seems to be testified by extensive hydrothermalism, very recent episodes (1970-71 and 1982-84) of shallow seismicity and ground deformation (exceeding rates of 100 cm/year in the years 1983-1984). Campi Flegrei probably

represent the most interesting example in the world of an active caldera that develops across a densely populated continental margin. As it partially develops beneath the sea water, over the inner continental shelf of Southern Italy, the Campi Flegrei area is an ideal site to test the potential of IODP shallow water drilling on a volcanic continental margin as well as long-term multi-platform drilling programmes including complete land-sea transects, within the frame of a first fully integrated IODP-ICDP proposal in the Mediterranean.