



## **Monitoring of hydrothermal gases at the Campi Flegrei caldera (South Italy): geochemical evidences from the pilot hole of CF Drilling Project**

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Scientific drilling is the only technique allowing to investigate, in a direct way, processes occurring at depth in active volcanic areas. Data and information obtained by drilling represent the most powerful method for understanding volcano dynamic and then significantly mitigating the volcanic risk. A very important case study is the active Campi Flegrei caldera, one of the highest risk volcanoes worldwide, hosting part of the large city of Naples (Southern Italy). The real-time analysis on the gas phase dissolved in the drill mud using a quadrupole mass spectrometer was carried out at the 506 m deep Campi Flegrei pilot hole in the framework of the Campi Flegrei Deep Drilling Project (CFDDP), co-funded by the International Continental Scientific Drilling Program (ICDP). We report the methods used and present the first results of the gas concentrations detected during the entirely process of drilling. Because the main components of drilling mud gas are from the air, in discussing mud gas logging results, we put particular emphasis on He, CH<sub>4</sub> and CO<sub>2</sub> which are the gas components that should originate from the deep fluids. The gas concentration showed a good correlation with the stratigraphic reconstruction along the drill hole. Lithological changes are often correlated with increasing amounts of gas. Our preliminary results provide important information to better understand volcanic and hydrothermal phenomena in the eastern sector of the Campi Flegrei caldera, and allow a joint interpretation of such geochemical data with those collected from the neighbouring Solfatara crater.