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Unattended gas-chromatography: applications of in situ micro-GC stations and their potential in geochemical monitoring

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Unattended gas chromatography monitoring station (U-ChroM –equipped with micro-GC computer, sampling systems, router) has been developed to allow complete remote control of the instruments and the automatic transmission of data. Furthermore, some specific parts have been adapted in order to allow a full automatic collection of gas samples from fumaroles, plumes, soil and of dissolved gases in cold and thermal waters. The instruments also permits in-situ gas analyses on samples collected in vials or directly through a line stuck in fumaroles or in the soil. This technique allows to obtain very quickly, in nearly real-time, soil gas concentration maps. We have already tested this device during the recent unrest crises of Santorini (Greece), Turrialba (Costa Rica), Solfarata (Campi Flegrei, Italy), as well as at Vulcano Island (Italy). We present some of these soil gas concentration maps as well as the results of continuous time series of collected data on fumaroles at Vulcano and on soil gas and gas dissolved in thermal water at the geothermal field of Torre Alfina (central Italy), discussing their geochemical and hazard implications.