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A new data logger for integrated geophysical monitoring

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GILDA digital recorder is a data logger developed at Osservatorio Vesuviano (INGV). It provides excellent data quality with low power consumption and low production cost. It is widely used in the multi-parametric monitoring networks of Neapolitan volcanoes and Stromboli volcano. We have improved the characteristics of GILDA recorder to realize a robust user-oriented acquisition system for integrated geophysical monitoring. We have designed and implemented new capabilities concerning the use of the low rate channels to get data of environmental parameters of the station. We also improved the stand-alone version of the data logger. This version can be particularly useful for scientific experiments and to rapidly upgrade permanent monitoring networks. Furthermore, the local storage can be used as back-up for the monitoring systems in continuous transmission, in case of failure of the transmission system. Some firmware changes have been made in order to improve the performance of the instrument. In particular, the low rate acquisition channels were conditioned to acquire internal parameters of the recorder such as the temperature and voltage. A prototype of the new version of the logger is currently installed at Campi Flegrei for a experimental application. Our experiment is aimed at testing the new version of GILDA data logger in multi-board configuration for multiparametric acquisitions. A second objective of the experiment is the comparison of the recorded data with geochemical data acquired by a multiparametric geochemical station to investigate possible correlations between seismic and geochemical parameters. The target site of the experiment is "Bocca Grande" fumarole in Solfatara volcano. By exploiting the modularity of GILDA, for the experiment has been realized an acquisition system based on three dataloggers for a total of 12 available channels. One of GILDA recorders is the Master and the other two are Slaves. The Master is responsible for the initial configuration of the GPS receiver for timing data. The two data loggers configured in slave mode await the end of the initial configuration and then receive the GPS timing data and PPS from the Master. This allows you to use one GPS receiver and optimize power consumption. The whole system is configured to continuously transmit data via WiFi and to locally store data.