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Four new WMO/GAW Observatories for the investigation of trace gas and aerosol variability in the Mediterranean hot-spot

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The Mediterranean Basin is considered a hot-spot region in term of air-quality and climate change due to the impact of anthropogenic and natural processes. Nevertheless, permanent infrastructures for the observations and the recognition of the atmospheric composition variability changes are still too sparse in this region.
To contribute to a more accurate and wide-spread observation system, in the framework of the Project "I-AMICA" - Advanced Infrastructure for the Environmental-Climatic Monitoring (a three years Italian National Operative Program - PON, co-founded by the European Regional Development Fund), four permanent Climatic-Environmental Observatories have been set up in the southern Italy: Lecce (Apulia Region, 40° 20' 8" N, 18° 07' 28" E, 37 m a.s.l.), Lamezia Terme (Calabria Region, 38° 52' 34" N, 16° 13' 56" E, 6 m a.s.l.), Capo Granitola (Sicily, 37° 34' N, 12° 39' E, 5 m a.s.l.) and Mt. Curcio (Calabria, 39° 31' N, 16° 42' E, 1796 m a.s.l). These Observatories were equipped with homogeneous and standardized experimental set-up for measurements of aerosol properties (number size distribution, absorption and scattering coefficient, mass, equivalent black carbon), reactive and greenhouse gases (O_3, NO, NO_2, SO_2, CO, CO_2, CH4).
The I-AMICA Observatories represent different conditions of the Mediterranean region, from suburban conditions at Lecce to costal background conditions at Lamezia Terme and Capo Granitola and high-mountain remote conditions at Mt. Curcio. The integration of the information from this high-quality observation network can be used for studies of aerosol transport from marine environment and Sahara desert, as well as for investigation of secondary pollutants formation in the gaseous and aerosol phase, investigation of continental outflow to Mediterranean Sea, impacts of vessel emissions on regional air quality and trans-boundary pollution.
In this work, we provide a preliminary overview of gas and aerosol variability, together with the description of selected special events registered in the first year of activity at these four regional GAW-WMO stations. A general characterization of these observatories in terms of location, meteorology and atmospheric transport patterns will be also provided. We also present and discuss the experimental set-up (sampling systems, calibration strategies, standards) used to implement WMO/GAW guidelines at each of these stations and methodologies to identify measurement period characterized by background conditions.