

Remote Sensing Atmospheric Monitoring in Naples in the frame of the ACTRIS Research Infrastructure

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Aerosols resulting from both anthropogenic and natural sources are among the main atmospheric constituents and play a key role in atmospheric processes, acting as unknown factors in the determination of the Earth radiative balance.

The direct influence of atmospheric aerosols on climate change and human life makes noteworthy important a deeper comprehension of their characteristics and on the processes involving them. Unfortunately, an exact knowledge is complicated by their great diversity; however, an increasingly in-depth knowledge is obtained by a joint study of their optical and microphysical properties and their variability in space-time. This is possible using remote sensing technologies. At the Department of Physics of the University of Naples Federico II there is a long tradition of atmospheric studies consolidated in recent years by the role of National Facility in the Aerosol, Clouds and Trace Gases Research Infrastructure (ACTRIS) [1], and the consequent establishment of the “Fine dust laboratory” at CeSMA, which allowed to combine scientific research with local services. In particular, through research based on remote sensing instrumentation we have been able to study the air quality air in the municipalities of the Vesuvius where there is often overruns of the limit values of pollution allowing to identify the aerosol sources [2], we have studied the volcanic plumes coming from the eruptions of the Etna, Eyjafjallajokull, Cumbre Vieja, distinguishing them from other aerosol sources thus increasing the safety connected to human risks, to quote just a few examples.

We have highlighted the anthropogenic contribution released into the atmosphere before and during the lockdown due to national measures in order to stop the spread of SARS-cov.2 [4]; finally, thanks to the great portability of this instrumentation, developed in collaboration with the spin off ALA srl, innovative studies have been conducted to characterize the aerosol properties in uncomfortable places such as the mouths of volcanoes [3] and high mountain.

A survey of the results from these missions will be presented highlighting the fundamental contribution that these studies offer for the knowledge and protection of the environment.

- [1] Pappalardo, Gelsomina. "ACTRIS Aerosol, Clouds and Trace Gases Research Infrastructure." EPJ Web of Conferences. Vol. 176. EDP Sciences,(2018).
- [2] C. De Marco, A. Boselli, A. D'anna, G. Perillo, A. Sannino, G. Sasso, M. Sirignano, N. Spinelli, and X. Wang. (2018) Coordinated multiparametric characterization of atmospheric particulate in the campania region of italy, WIT Transactions on Ecology and the Environment, Vol 230, © 2018 WIT Press - Air Pollution XXVI 619 (2018).DOI: 10.2495/AIR180581
- [3] Sellitto, Pasquale, et al. "Small-scale volcanic aerosols variability, processes and direct radiative impact at Mount Etna during the EPL-RADIO campaigns." Scientific RepoRtS 10.1 (2020): 1-13.