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Air pollution assessment using a cost-effective device: the case study of the northern Latium coastal area.

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The increase in urbanization requires intense energy consumption and causes an increase in emissions from transportation and industrial sources. As a result, a variety of pollutants are released into the atmosphere with negative effects on the health of organisms and ecosystems as well as on human health. In this perspective, coastal areas are considered "hotspots" of environmental contamination since they often host multiple human activities. This issue is particularly dramatic close to important maritime hubs, as a matter of fact overall 25% of the world energy consumption (a major source of pollution) is employed for transport, and over 80% of world trade is carried by sea (Gobbi et al. 2020). During 2019-2020 we carried out a continuous monitoring of particulate matter in a fixed station to understand the sources of air pollution in the northern Latium coastal area. This area has been selected for the presence of industrial activities located in a few kilometers of coast (Piazzolla et al. 2020). The amount and typology of solid particles present in the environment have been assessed by implementing a reliable cost-effective device (Gozzi et al. 2015, 2017) which integrates an optical particle counter and a filtering set-up able to collect particulate matter with dimension > 400 nm (Della Ventura et al. 2017). Filters were periodically removed from the device and recovered microparticles were subjected to microscopic (optical and electron), spectroscopic (IR, Raman), and microchemical (SEM-EDS) characterization. Results were related to the wind speed and direction measured by the Civitavecchia Coastal Environment Monitoring System (Bonamano et al. 2015), allowing an evaluation of the contribution of anthropic (industrial and maritime) activities to the pollution in this area.

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