



Saharan dust outbreaks associated with incidence of respiratory diseases in Crete Island, Greece

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Crete Island, located in the Southeastern Mediterranean basin, is of significant vulnerability with respect to Saharan dust episodes. Higher frequency of increased dust transport appears in spring and autumn seasons, affecting particulate matter concentrations, which are associated with either short or long term effects on human health. The residence time of dust particles depends on the meteorological conditions that favor the dry and wet deposition.

A retrospective analysis in order to quantify the impact of Saharan dust episodes on respiratory diseases in Heraklion, Crete Island, by analyzing these natural outbreaks during 2008-2011, is the objective of this study. The discrimination of the Saharan dust events was carried out by estimating the particulate matter excesses recorded at Finokalia station. The sampling station is situated on the north coast of Crete, located at the top of a hilly elevation (250 m asl). The nearest large urban centre is Heraklion with 150,000 inhabitants located 70 km west of Finokalia, thus the station could be characterized as background station and ideal for tracking and recording Saharan dust outbreaks. Additionally, Moderate Resolution Imaging Spectroradiometer (MODIS) products such as aerosol optical depth (AOD), aerosol small mode fraction (SM), Ångström exponent in the 550-865 nm band and mass concentration, were used. The medical data analyzed concern daily counts for respiratory admissions, which were acquired from the two main hospitals in Heraklion.

The performed analysis revealed significant results indicating the adverse impacts of Saharan dust, exacerbating the respiratory problems of the inhabitants of Heraklion, which in many cases have been considered as emergency situations. Taking into account the oncoming climate change, these natural phenomena are very likely to appear more frequently, due to droughts and higher air temperatures. This will drive in increased respiratory impacts of the local population, and therefore this synergistic impact of climate change should alert authorities to take measures in order to mitigate and strengthen the resilience of the society.