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Source identification of aerosol chemical composition in the Atlas region of North Africa.

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Aerosol particles are important constituents of the atmosphere due to their role in controlling climate-related processes. In addition, their impacts on air quality and human health make it essential to study. However, the characterization and the identification of natural and anthropogenic atmospheric particles can be challenging due to the complex mixture occurring during atmospheric transport. Background locations such as high-altitude sites provide valuable infrastructure for obtaining representative data for understanding various pathways for aerosol interactions useful in assessing atmospheric composition. However, information about aerosol characteristics at high-altitude in the African regions and their relation to urban aerosol composition is still not well understood. In the present study, PM_{10} and $PM_{2.5}$ particulate matter was characterized at two different sites in the North African region of Morocco. A background site located at the newly established AM5 research station in the Middle Atlas region at an altitude of 2100 m and an urban site situated in a polluted city, Fez. The goal was to determine chemical components, evaluate Saharan dust's role on the PM10 concentrations between the sites, and assess the impact of urban pollution on background aerosol composition. The results indicate that the background aerosol composition is influenced by both regional and trans-regional transport. Despite the site's proximity to the Sahara Desert, the deserts influence on the atmospheric composition was observed for only 22% of the time and this was mainly seasonal. Marine air masses were more dominant with a mixture of sea salt and polluted aerosol from the coastal regions especially during wintertime. Furthermore, high concentrations of mineral dust were observed during the daytime due to the resuspension of road dust. At the same time, an increase of PAHs and anthropogenic metals such as Pb, Ni, and Cu were found during the nighttime because of the boundary layer variation. The Fez's urban site is characterized by a high contribution of elemental carbon (6%) and organic biomass tracers (3%) such as Levoglucosane and 4-nitrophenol.