



Morphological, Mineralogical and Elemental Characteristics of Particulate Matter over the Industrial Zone in the Eastern Province of Saudi Arabia

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During the last decade, particulate matter (PM) have been extensively studied due to their well-known negative health impacts on humans' respiratory system. Physical and chemical characteristics of PM are however site specific. The Eastern province of Saudi Arabia is mostly an arid region and experiences frequent dust storms and prolong particulate matter suspension in the ambient air. Furthermore, the region hosts intensive industrial activities including mining, petrochemical, and oil/gas industries. Emissions from these industrial activities are expected to affect the composition and characteristics of PM over the region. Limited research has been conducted to investigate the characteristics of PM in this part of the world. Thus, this study aims to investigate the physical and chemical characteristics of PM₁₀ over two major industrial zones in the region; namely Jubail and Ras Tanura industrial cities. Samples were collected using a high-volume air sampler in the two cities and analyzed by SEM for morphological characteristic, XRD for mineralogical characteristics and XRF, ICP/MS for elemental composition of the trace metals carried by PM. Results of the study showed that the majority of particles were agglomerated with fine mode irregular shape (diameter: 1.4 - 2.8 μm). Results also revealed that the main minerals of PM collected were quartz, zeolite, kaolinite, mascagnite, calcite, and gypsum. The study also showed that zinc, barium, aluminum and iron were the main metals detected.