

PRODUCTION AND TRANSFORMATION OF ANTHROPOGENIC AND NATURAL AEROSOLS IN THE MEDITERRANEAN REGION

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Various research and operational activities related to air quality analysis and forecasting showed that European air quality standards related to particulate matter are often violated not only from the anthropogenic activities but from the contribution of natural sources. The main contribution of natural sources in such air quality degradation in Europe is from the transport of Saharan dust. Mineral dust is injected into the atmosphere in large amounts through sporadic but intense dust storms generated over Sahara desert. Air quality is affected significantly by increasing the particle concentrations in the atmosphere and reducing visibility. Such an effect is also attributed to the fine particulate sulphates in the atmosphere. Since the long-range transported dust particles are mainly of the size of PM_{2.5} the impacts on health are considerable but most of them are still unknown. In general, desert dust as well as aerosol sulphates, affects human health and human welfare of hundreds of millions people in Europe and North Africa. In order to examine the degradation of the air quality due to the synergetic effects of desert dust and sulphates, simulations were performed with the aid of advanced regional atmospheric and photochemical models. In addition, the estimation of the SO₂ to sulphate ratio provides with qualitative information on the paths and scales of sulphate production, transformation and chemical age in the Mediterranean Region. The integrated approach followed in this work can provide useful information concerning the air quality degradation in urban environments as well as the Greater Mediterranean Region.