

Preface to Dust Events in the Environment

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Abstract: The special volume entitled “Dust Events in the Environment” updates the state of the art and perspectives focused on the interactions between natural and urban events of dust with the environment, keeping an eye to the associated impacts and to sustainable development. The volume updates previous studies on dust as the topic is timely and future discussions are necessary to further investigate such events.

Keywords: dust; particulate matter; sand and dust storms; volcanic ash; environmental impact; socio-economic impact

1. Rationale

Scientific studies devoted to sustainable development may metaphorically stand beside giants rather than on shoulders of giants. There are short-term historical cycles, let's say of a few decades, in which previous knowledge is accounted for or vice versa is neglected. When the scientific focus is the environment and its use, then an update on the state of art and perspectives is necessary at such short-term scale. We have done that in the present special volume by collecting integrated studies on natural and urban dust in the environment from international researchers. One of the issues in the volume is the development and implementation of policies designed to mitigate the impact of dust. This is due to the recent marked increase in wind erosion and associated sand and dust storms (SDS) in several parts of the planet (contribution 1). The economic impact and risk assessment of SDS and their impact mitigation have been covered in this volume (contributions 1,7). The rigorous investigation of SDS as the main natural events of particle transport in the Arabian Gulf, in China, and in Kuwait, has been also enclosed (contributions 1,3,6,7). The investigation relates not only to the mode of particle transport but also to the actual impact in the environment. Another issue in the volume is the extension of such investigation to volcanic ash and air pollution, impacting the built environment in New Zealand, and in Korea (contributions 2,8). A further issue in the volume is the understanding of fine particulate matter and associated ecological impact, for example, in the United Arab Emirates (contributions 4,5). The different studies have made use of advanced experimental techniques to characterize the particulate matter, and all have kept a particular eye to the actual impact in the environment. This special volume covers essential topics about dust phenomena such as their impact mitigation, risk assessment, policies, economic impact, physical and chemical properties of particles and associated pollutants.

2. List of Contributions

1. Sand and Dust Storms: Impact Mitigation, by Middleton and Kang.
2. Impact of Volcanic Ash on Road and Airfield Surface Skid Resistance, by Blake et al.

3. Types, Indications and Impact Evaluation of Sand and Dust Storms Trajectories in the Arabian Gulf, by Al-Dousari et al.
4. Exploring Sustainable Street Tree Planting Patterns to Be Resistant against Fine Particles (PM_{2.5}), by Kim et al.
5. Characterization of Fine Particulate Matter in Sharjah, United Arab Emirates Using Complementary Experimental Techniques, by Hamdan et al.
6. Characterizing Sand and Dust Storms (SDS) Intensity in China Based on Meteorological Data, by Cao et al.
7. Economic Impact and Risk Assessment of Sand and Dust Storms (SDS) on the Oil and Gas Industry in Kuwait, by Al-Hemoud et al.
8. Spatial Relationships between Urban Structures and Air Pollution in Korea, by Chel Jung et al.

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