

# **DUST** **2021**

**4<sup>th</sup> International Conference on Atmospheric Dust  
HYBRID MEETING**

Torre Cintola Conference Centre - Monopoli, Italy | 4-7 October, 2021

## **LIST OF SESSIONS**



## **CM01 | IMPACT OF DUST ON TERRESTRIAL AND CRYOSPHERIC SYSTEMS: DEPOSITION AND GEOCHEMISTRY**

The session will look at the impact of dust deposition on the geochemistry of soils, snow, and ice, and even lacustrine environments. Papers applying to this session could also deal with the impact of albedo change and melting of snow and ice and the consequences of dust import on vegetative growth and ecosystem development. A major focus will be the on the geochemistry and mineralogy of dust input and how it can affect the geochemistry and biogeochemistry of these systems.

W. Berry Lyons | The Ohio State University | United States | lyons.142@osu.edu  
Anne E. Carey | The Ohio State University | United States | carey.145@osu.edu

## **CM02 | INTERACTIONS BETWEEN DUSTS AND ATMOSPHERIC TRACE GASES: IMPACT ON ATMOSPHERE AND DUST SURFACE PROPERTIES**

Interestingly, heterogeneous chemical processes occur at the surface of atmospheric dust particles irrespectively of their origins (desert, oceans, volcanoes...). The uptake and the possible reactions of atmospheric trace gases onto dust surfaces can affect first the composition of the atmosphere, and second the physical and chemical surface properties of the dust itself. These aspects have to be further addressed through (i) laboratory experiments, (ii) field campaigns and (iii) modeling. This session welcomes inputs and discussions about the interactions of any atmospheric trace gases (VOCs, NO<sub>x</sub>, SO<sub>x</sub>, HO<sub>x</sub>, O<sub>3</sub>, H<sub>2</sub>O, radicals...) with atmospheric mineral dust particles. It aims at addressing the impact of heterogeneous processes on (i) the composition and reactivity of the atmosphere, (ii) the ageing of the surface of mineral aerosols, (iii) the hygroscopic and the optical properties of dusts.

Frédéric Thevenet | IMT Lille Douai | France | frederic.thevenet@imt-lille-douai.fr  
Manolis Romanias | IMT Lille Douai | France | emmanouil.romanias@imt-lille-douai.fr

## **GR01 | PALEODUST ARCHIVES: OBSERVATIONAL CONSTRAINTS ON THE GLOBAL DUST CYCLE**

Mineral dust is a major component of the global atmospheric aerosol load. Dust emissions are influenced by climate change, and dust, in turn, can affect climate and biogeochemical cycles. Spatial and temporal variability of dust emissions and transport, as well as uncertainties in the particle size distributions and size-dependent physical and chemical properties, render dust an uncertain component of the climate system. Climate archives constitute natural dust samplers, and preserve precious information about past variability in the dust cycle. Under opportune circumstances, climate archives provide us with quantitative reconstructions of dust mass accumulation rates; when paired with additional information, such as measurements of particle size distributions, they have a great potential for reconstructing the global dust cycle. We invite contributions aimed at building up a quantitative observational reference framework from paleodust archives, as well as contributions from the modeling community with the potential to constrain and validate Earth System Models.

Scientific Committee | DUST 2021 | Italy | info@atmodust.net



## **GR02 | DUST AND SOILS IN ARID, SEMIARID AND MEDITERRANEAN REGIONS OVER QUATERNARY TIME SCALES**

During the last decades we witnessed an impressive increase in the number of studies on atmospheric dust, dust sources and dust environmental aspects. However, the term dust is still too general in its use and includes a wide-range of dust, soil, and sediment types within diverse disciplines, each referring to dust differently. Among other properties, dust types can differ in their mineralogy, grain size, accumulation rates, and formational and transport processes. The aim of the session is to bring together researchers from disciplines such as mineralogy, sedimentology, pedology, Quaternary geology, and atmospheric sciences to discuss dust types and their role in soil formation in general and in regions where weathering rates and in-situ soil production are relatively low in particular; i.e. where dust accretion control soil formation. We will discuss issues such as dust and paleo-dust definitions; processes forming diverse dust types and their respective sources, dust transport mechanisms and distance of transport, dust accumulation in soils and dust forming soils, processes of loess and loessial soil formation and loess distribution. Can dust grain size and mineralogy alter soil accretion rates and soil productivity? Can soils be productive with minor dust influx? What is the association of climate and paleoclimate (in term of changing dust influx) in soil formation? What is the degree of soil conservation in arid to semiarid Mediterranean region with maximal and minimal rates of dust flux; what is the effect of long distance and short distance dust storms on soils.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

## **HE01 | HEALTH IMPACTS OF ATMOSPHERIC DUST**

About seven million premature deaths annually are attribute to air pollution. Therefore, every attempt should be made to reduce the emissions from all anthropogenic sources. Pollutant emissions do not only comprise CO<sub>2</sub> and noxious gases, but also solid particles, which range in size from nanoparticles through PM<sub>2.5</sub> and PM<sub>10</sub> to super-coarse particles (>10 µm).

Detailed characterization of these particles is essential to improve our understanding of their health impacts. Characteristics that may determine the fate and toxicity of mineral particles in biological and environmental systems include dimensional distribution, morphometry, fractal dimensions, bulk and surface chemistry, and physical properties. Assessment of the important roles that these parameters may play in determining the hazard represented by a homogenous or heterogenous mineral-particle population is fundamental to the health risk evaluation. Moreover, studying the contribution of each of these parameters and variables in a complex system provides essential tools to build solid toxicity- and impact-evaluation models.

This session welcomes studies dedicated to the characterization and modeling of complex particle populations. Particular attention will be paid to multi-analytical approaches, advanced electron microscopy, and spectroscopy methods. Furthermore, we invite contributions in the areas of segmentation and learning, machine learning, and neural-network approaches that allow to speed up the characterization process and improve the quality of the characterization of morphometrically and chemically complex particle populations.

Reto Gieré | University of Pennsylvania | United States | [gier@sas.upenn.edu](mailto:gier@sas.upenn.edu)  
Ruggero Vigliaturo | Casale Monferrato | Italy | [ruggero.vigliaturo@gmail.com](mailto:ruggero.vigliaturo@gmail.com)



## **HE02 | ATMOSPHERIC AEROSOL PARTICLES: MONITORING, NATURAL AND ANTHROPOGENIC SOURCES IDENTIFICATION**

Nowadays, atmospheric aerosol particles (referred also to as PM, Particulate Matter) have recently grown in scientific interest due to their harmful effects on human health and its involvement in pollution problems and global climate change. Particulate matter is a complex mixture of suspended solid and liquid particles with different physical and chemical properties (e.g., size distribution, chemical, geochemical and mineralogical composition). The composition of the particles varies widely depending on their source that can be anthropic, (e.g., industrial activities, road traffic and residential heating) or natural, (e.g., local soil, deserts, volcanoes, sea and forest fires). The determination of atmospheric particles chemical composition and their identification represent key tools for evaluating the environmental and health impacts, characterizing the atmospheric processes in which it is involved, and developing cost-effective and successful remediation measures. This session enters this context and aims to bring together researchers involved in the study of the PM<sub>x</sub> (e.g., PM<sub>10</sub>, PM<sub>2.5</sub>, PM<sub>1</sub>) and encourages contributions regarding PM in-situ measurement, chemical, geochemical and mineralogical characterization and morphological observation to the identification of natural and anthropogenic aerosol particles sources.

Rosa Caggiano | Institute of Methodologies for Environmental Analysis - CNR | Italy |  
rosa.caggiano@imaa.cnr.it

Vito Summa | Institute of Methodologies for Environmental Analysis - CNR | Italy |  
vito.summa@imaa.cnr.it

Rosa Sinisi | Institute of Methodologies for Environmental Analysis - CNR | Italy |  
rosa.sinisi@imaa.cnr.it

## **HE03 | TRACE ELEMENTS INTO ANTHROPOGENIC AND NATURAL DUST AND THEIR INFLUENCE ON HUMAN HEALTH**

Recent researches has outlined the harmful effect of trace elements into atmospheric dust on human health in all those areas where there is a great presence of anthropogenic and urban activities. It is well known that trace elements composition of dust and their associated toxicity is different in several environments and depends from both human and natural activities.

This session focuses on harmful impact of trace elements of dust into environment and human health.

Giovanna Rizzo | University of Basilicata | Italy | giovanna.rizzo@unibas.it

Michele Paternoster | University of Basilicata | Italy | michele.paternoster@unibas.it

Roberto Buccione | University of Basilicata | Italy | roberto.buccione@unibas.it

## **HE04 | SPATIO-TEMPORAL MODELING FOR ATMOSPHERIC PARTICLES DATA**

Vehicular traffic, industrial activity and street dust are important sources of atmospheric particles, which cause pollution and serious health problems, including respiratory illness. Hence, techniques for analyzing and modeling the spatio-temporal behaviour of particulate matters, in the recent statistical literature, represent an essential support for environmental and human health protection. Contributions on modeling and prediction are of interest.

Sandra De Iaco | Unisalento | Italy | sandra.deiaco@unisalento.it



## **HE05 | APPLICATION OF ARTIFICIAL INTELLIGENCE TO ENVIRONMENTAL ANALYSIS**

The session will consider all the techniques regarding the usage of artificial intelligence (AI) for environmental data analysis. Artificial intelligence represents nowadays a powerful tool for environmental data analysis. Algorithms supported by AI could include image analysis for the pollution pattern recognition, air pollution forecast, and definition.

Daniele Sofia | University of Salerno | Italy | [dsofia@unisa.it](mailto:dsofia@unisa.it)

Nicoletta Lotrecchiano | DIIN - Department of Industrial Engineering, University of Salerno | Italy | [nlotrecchiano@unisa.it](mailto:nlotrecchiano@unisa.it)

## **HE06 | SDS IMPACTS ASSESSMENT (VULNERABILITY MAPPING AND RISK ANALYSIS)**

Dust storms (SDS) can cause considerable damage at their source, transport and deposition areas. Developing impact mitigation and adaptation policies requires a clear picture of the level of exposure to harm from SDS and society's ability to cope and adapt to SDS impacts. Assess and map the vulnerability and risk level of societies to SDS can provide such a picture of the potential affected populations. SDS impacts assessment is essential to gain knowledge on the level of exposure, sensitivity to harm and coping and adapting capabilities of the affected populations to harm caused by this devastating hazard. Determining which group, community, sector or region is impacted by SDS and to what extent, enables appropriate and effective responses to be followed.

This session is aimed to provide an opportunity to "show and share" professional works on a wide range of SDS impact issues in diverse contexts, from basic scientific works to practical project implementations to combat SDS for disaster risk reduction purposes. Reseaches at any stage of implementation process are welcome.

Ali Darvishi Bolorani | University of Tehran | Iran | [ali.darvishi@gmail.com](mailto:ali.darvishi@gmail.com)

## **HE07 | METALS, AMBIENT PARTICULATE MATTER, AND HEALTH**

The composition of ambient particulate matter (PM) can vary greatly by region and over time. These differences can be due to local or regional geochemistry (e.g. high silica content of sand in the Saharan Desert, mafic soil in the Hawaiian Islands), transient geological features (e.g. dust storms, volcanoes, landslides, and earthquakes) and/or anthropogenic additions (e.g. burning of fossil fuels). This session will focus on the deleterious nature of the metal constituents within PM with a particular focus on the transition metals iron, manganese, chromium, copper, and vanadium given their ability to take part in Fenton chemistry.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

## **HE08 | NEW ANALYTICAL APPROACHES TO ADDRESS HEALTH EFFECTS OF FINE DUSTS**

The session welcome contributions related to new analytical approaches to address health effects caused by dusts with a special emphasis to fine and ultrafine dusts.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)



## **HE09 | BIOMONITORING OF ATMOSPHERIC DEPOSITION OF COSMIC DUST**

Moss biomonitors are widely used to trace atmospheric deposition of heavy metals, nitrogen, persistent organic compounds (POPs) and radionuclides (<http://icpvegetation.ceh.ac.uk/>). In the recent years several successful attempts were undertaken to study deposition of cosmic dust using the same moss biomonitors. This session invites contributions for monitoring long-term and large-scale deposition of air pollutants based on moss analysis.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

## **HE10 | DUST IN THE SEA - IMPACT ON BIOGEOCHEMISTRY AND CLIMATE**

Dust laden nutrients deposited in surface waters affect phytoplankton with impact for their primary productivity, biomass and biodiversity. Primary productivity is a critical step for climate regulation. Given that iron limits primary productivity in up to 30 % of the ocean and that most of the dust being deposited bear a significant amount of iron, its solubility, reactivity and bioavailability are actively studied. Such research goals are part of the GEOTRACES international science program. In order to improve our understanding of the links between continental dust, the ocean and the carbon cycle, this session welcomes contributions on the fate of elements delivered by atmospheric dust to the ocean, their bioavailability and their implication for the primary productivity. As the consequences from global change on dust deposition and atmospheric processing remain unknown, contributions on the global impact of dust oceanic deposition nowadays but also in the future are also welcome.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

## **IM01 | IDENTIFICATION AND MONITORING OF ASH/DUST EVENTS FROM SPACE: ADVANCES AND FUTURE PERSPECTIVES**

Ash/dust events are natural phenomena that may strongly affect both environment and climate. Desert dust aerosols increasing the PM10 on ambient air may also pose a serious threat to human health. Volcanic ash, which is capable of seriously damaging aircraft engines, may represent an important cause of air traffic disruptions. An efficient identification, monitoring and quantitative characterization of ash/dust plumes is then crucial to mitigate their impact on social and economic human activities. Satellite remote sensing may give an important contribution for this purpose, whether information provided by satellite platforms orbiting around Earth (which guarantee global coverage, continuous and repetitive observations) is fully exploited. This session focuses on methods and procedures aiming at improving identification of ash/dust clouds from space. Applications of satellite techniques to specific case studies are also welcome. We encourage the submission of abstracts on this topic in order to evaluate progresses in the field also in view of the usage of new geostationary satellite systems, which guarantee improved temporal, spatial and spectral resolutions.

Francesco Marchese | Institute of Methodologies for Environmental Analysis - CNR | Italy | [francesco.marchese@imaa.cnr.it](mailto:francesco.marchese@imaa.cnr.it)

Nicola Pergola | Institute of Methodologies for Environmental Analysis - CNR | Italy | [nicola.pergola@imaa.cnr.it](mailto:nicola.pergola@imaa.cnr.it)

Alfredo Falconieri | Institute of Methodologies for Environmental Analysis - CNR | Italy | [alfredo.falconieri@imaa.cnr.it](mailto:alfredo.falconieri@imaa.cnr.it)



## **IM02 | HIGH RESOLUTION ACTIVE OPTICAL REMOTE SENSING OF DUST AEROSOL LAYERS**

This session focuses on new observations of dust events on sub-km, sub-diurnal scales enabled by active and passive optical remote sensing (lidar and multispectral satellite imagers) methodologies. Contributions describing original research results from ground-based, airborne, and space-based observational vantage points are solicited. In particular, geometrical and optical properties of dust layers are important in climate, radiation budget, and cirrus cloud formation research. One of the goals of the session is therefore to survey the state-of-the-art of remote sensing techniques for determining the vertical and horizontal distribution of clouds and aerosols (mainly dust) throughout the atmospheric column. Another topic that benefits greatly from those techniques is the elucidation of chemical and physical processes that occur in moderately and heavily dust polluted environments. For this application it is necessary to accurately describe the planetary boundary layer dynamics and depth evolution (a field in which lidar techniques excel). Other topics of interest for this session include: Process studies related to atmospheric composition, pollution, transport, and dynamics, and convective storm development.

Simone Lolli | Institute of Methodologies for Environmental Analysis - CNR | Italy |  
simone.lolli@imaa.cnr.it

Daniel Perez-Ramirez | University of Granada | Spain | dperez@ugr.es

## **MF01 | MICROPHYSICAL, CHEMICAL AND OPTICAL PROPERTIES OF MINERAL DUST**

Dust is an important component of the Earth's climate system. However, many of its impacts on climate, such as radiative interactions, dust-cloud interactions and interactions with the biosphere are dependent on particle composition, size and shape. These properties may vary regionally and also be modified during atmospheric transport. All these properties also control the spectral optical properties of mineral dust, which are critical in determining how they interact with radiation through the direct and semi-direct radiative effects. This session will focus on understanding and quantifying composition, size and shape distributions of mineral dust aerosols and their role in affecting the shortwave and longwave optical properties and radiative effects of dust. We welcome contributions from laboratory experiments, fieldwork, remote sensing and modelling studies, both from local to global scales, and we also especially encourage contributions reporting on the combinations of different approaches.

Claire Ryder | University of Reading | United Kingdom | c.l.ryder@reading.ac.uk

Claudia Di Biagio | LISA, CNRS IPSL | France | claudia.dibiagio@lisa.ipsl.fr

Carlos Perez Garcia-Pando | Barcelona Supercomputing Center | Spain | carlos.perez@bsc.es

## **MF02 | MULTIVARIATE ENVIRONMENTAL ANALYSIS**

In environmental sciences, it is very common to observe spatio-temporal multiple data concerning several correlated variables which are measured in time over a monitored spatial domain. In multivariate Geostatistics, the evaluation of their behavior is often based on the knowledge of the spatio-temporal multivariate covariance structure. New techniques for handling multivariate spatial or spatio-temporal data are in great demand .

Monica Palma | Unisalento | Italy | monica.palma@unisalento.it

Donato Posa | Dipartimento di Scienze dell'Economia - Unisalento | Italy |  
donato.posa@unisalento.it

Sandra De Iaco | Unisalento | Italy | sandra.deiaco@unisalento.it



### **MF03 | MODELING FOR VECTORIAL DATA**

Vector data in two dimensions find its suitable representation in the framework of complex-valued random fields, which is particularly appropriate when the elements of a vector random field are associated to homogeneous entities connected with the same physical phenomenon, expressed in the same units of measure, such as wind speed, sea current, force, electrical or magnetic field. The spatial analysis of these phenomena was conducted using different approaches. Theoretical aspects of complex stochastic random fields and techniques to construct complex covariance models are welcome.

Donato Posa | Unisalento | Italy | [donato.posa@unisalento.it](mailto:donato.posa@unisalento.it)

### **MF04 | ATMOSPHERIC TRANSPORT AND MODIFICATION OF MINERAL DUST**

Mineral dust is one of the major aerosol types in a global context. Besides its direct climate impact, by indirect effects it modifies cloud processes and precipitation, serves as nutrient supply for marine and terrestrial ecosystems, and affects human health. After emission, dust may undergo considerable changes by atmospheric processes, such as modifications of the particles like chemical reactions and mechanical mixtures, but also modifications to the dust aerosol body, like selective removal of particles, dilution and admixture of non-dust particle types. As consequence, the impact of dust on the global system may change considerably, e. g. by modification of the radiative transfer due to size distribution changes or mobilization of trace compounds by chemical processing. This session calls for field observations and modeling studies on mineral dust aerosol atmospheric modification. Topics can include near-source modifications as well as ageing during long-range transport, anthropogenic as well as natural ones. Single-site and networked observations, large field campaigns and time series observations are equally welcome. Pure modeling studies, insitu and remote sensing observations and any combined approaches are invited.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

### **MF05 | DISPERSAL OF VOLCANIC ASH IN THE ATMOSPHERE**

Volcanic ash is the result of intense magmatic or phreatomagmatic fragmentation during explosive volcanic eruptions. After injection into the atmosphere, the ash is dispersed as convective columns and umbrella clouds, which are subject to the combined effects of gravity and wind speed, or are transported close to the ground as pyroclastic density currents. The injection of ash into the atmosphere can cause damage to aircraft or can impact public health. Ash leachates can result in pollution of water resources, damage to agriculture and forest, affect pasture and livestock health, impinge on aquatic ecosystems and alter the geochemical environment of the seafloor. This implies that the full address of the distal ash hazards from active volcanoes urges for preventing crises in human communities, which are underpinned and increasingly dependent on multiple layers of interconnected infrastructure. The session welcomes both oral and poster presentations about volcanic ash production, dispersal and impact evaluation over territory and infrastructure. Studies based on field, laboratory and numerical models fit the aim of the proposed session.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)



## **MF06 | SAHARAN DUST**

This session intends to bring together the scientific communities of air pollution modelling and atmospheric observations focusing on Saharan dust. The main aim of the proposed session is to evaluate the state-of-the-art (recent results and current problems) related to the investigation of desert dust advection over the Mediterranean basin and of the impact these natural particles have on the PM<sub>x</sub> concentrations measured at ground level, from the regional to the local scale. Presentations covering the research area of air pollution modelling and observational techniques (including sensors development) are welcome. In this session, we invite contributions regarding the atmospheric processes taking place in the planetary boundary layer in the presence of mineral particles advected from the Sahara desert.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

## **MF07 | ASIAN DUST**

Asian Dust is often understood as large amounts of lofted mineral dust above Asia. But its sources and sinks are not necessarily only in Asia: the dust may also be advected from far away sources like the Saharan desert. Hence, Asian dust is more than a regional phenomenon. After the dust is lofted into the atmosphere, it will be transported and mixed with other atmospheric particle types. Its optical and chemical properties may be changed by aging on its way through the atmosphere. Asian Dust affects not only the atmospheric radiation budget, but also human health, and even economics. Thus, the Asian Dust needs a multiple-dimensional approach into several directions and scientists of different disciplines are working on this phenomenon. A comprehensive study of Asian Dust in the atmosphere is only possible with a combination of ground-based, airborne and space-borne measurements with additional regional and global modelling approaches. The goal of the proposed session is to bring scientists together and to gain more insight into the different aspects of Asian Dust: its properties, its sources, its transport mechanisms and processes, its effects on humans, and finally on its sinks.

Scientific Committee | DUST 2021 | Italy | [info@atmodust.net](mailto:info@atmodust.net)

## **TD01 | DUST IN THE URBAN ENVIRONMENT**

Studies conducted in different regions demonstrated that the dust deposition plays a significant role in shaping the urban environment. Unlike natural landscapes, an intense anthropogenic impact on exposed surfaces supplies significant amounts of sedimentary material in the urban environment. Besides the health effects, the dust deposition affects aesthetic, economic, and other aspects of city life. Sedimentation is accompanied by the accumulation of dirt and dust over the urban surfaces, which reduce the quality of the urban environment. A high level of sediment accumulation in the urban landscape causes a negative perception of the environment by citizens. The negative aesthetic effects include the deterioration of the appearance of residential areas and objects of the urban landscape, buildings, vehicles, etc. Regular dust and sediment supply increases costs for municipal services such as cleaning and stormwater systems maintenance. Due to physicochemical characteristics and ability to carry various organic and inorganic toxicants, dust and sediments deposited in streets and roads are characterized as a non-point source of pollution. Sediment deposition in urban areas has received considerable attention in recent years due to the ease of sampling of sediment material and its potential to act as a proxy for urban pollution and indicator of emission of potentially harmful elements.



Andrian Seleznev | The Zavaritsky Institute of Geology and Geochemistry - UB RAS Russian Federation | sandrian@rambler.ru

Iliya Yarmoshenko | Institute of Industrial Ecology | UB RAS | Russian Federation | ivy@ecko.uran.ru

Dmitry Vlasov | Moscow State University | Russian Federation | vlasov.msu@gmail.com

## **TD02 | DUST STORMS: DRIVERS, CHARACTERISTICS AND IMPACTS**

Mineral dust aerosols are known for their large impact on the climate system. The sporadic occurrence of dust storms and the heterogeneous spatial distribution of dust aerosols make the assessment of their net effect on the regional and global climate a difficult task. The underlying processes involved in the dust cycle and related impacts are highly variable and dependent on location, atmospheric dynamics and thermodynamics. This includes the atmospheric conditions that control dust emissions and transport and the interactions of dust aerosols with the radiation and associated feedback.

This session aims at showcasing recent research progress and augmenting existing knowledge in the role of atmospheric dynamics in dust storms and the radiative impact of atmospheric dust aerosols. It will provide a setting to foster discussion and help identify gaps, tools, and studies that can be designed to address these open questions within the community.

We invite contributions on all observational and numerical modelling aspects that address the links between atmospheric dynamics and the dust cycle. This may include studies on past, present and future of:

- The meteorological aspects that cause dust storms at various places around the world: Atmospheric dynamics and synoptic and meso-scale weather phenomena that trigger dust storms (i.e., cyclones, fronts, density currents, convection etc).
  - The variability of the large-scale atmospheric circulation (such as polar jet, subtropical jet, troughs, heat lows) and impact on the dust activity and its variability,
  - The characteristics of dust storms, including climatology, spatial and temporal variability, vertical transport and extend of the dust plume, emission and deposition rates,
  - The radiative impacts of atmospheric dust aerosols including effects on the atmospheric circulation and clouds and feedback on the climate system,
  - Teleconnections and climate indices and their role in atmospheric dust variability in the dust belt,
- Presentations including new observational (ground and satellite based) and modelling methodologies specific to arid and desert regions are encouraged. Contributions related to results from recent field campaigns are also welcomed.

Diana Francis | Khalifa University of Science and Technology | United Arab Emirates | diana.francis@ku.ac.ae

Dimitris Kaskaoutis | National Observatory of Athens | Greece | dkask@noa.gr

## **UD01 | THE UNIVERSE OF DUST - OPEN SESSION**

This symposium covers any other topic not included in the Sessions listed above.

Scientific Committee | DUST 2021 | Italy | info@atmodust.net



## **UD02 | MINERAL DUST AND ANTHROPOGENIC PARTICLES AS CARRIERS OF VIRUSES AND BACTERIA**

There are several studies documenting that natural and anthropogenic atmospheric particles are significant vehicles for microbial dispersal. Areal distribution and diversity of airborne microbial communities are influenced not only by source locations (dry/cold deserts, seas, lakes, inner land, peninsulas, etc-) and seasonal related changes but also by lithology of source areas. Also transport, that may take place over very long distances, impacts on microbial communities due to the environments over which the air mass is traveling.

At a smallest scale, household dust may be a vehicle of microbes able to spread antibiotic resistance. And particulate matter, which ever its origin, could be also able to influence pandemic incidence rates.

This session welcome contributions for discussing associations between viruses, bacteria, and organic/inorganic and natural/anthropogenic dust.

Saverio Fiore | IMAA-CNR | Italy | [saverio.fiore@cnr.it](mailto:saverio.fiore@cnr.it)

José A. Centeno | EHSC | USA | [jacenteno@comcast.net](mailto:jacenteno@comcast.net)