

DUST STORM Research Initiative

Inhalable airborne desert **DUST**: A comprehensive **STudy On** physical micro-structure, chemical composition and **R**espiratory toxicity of fine **M**ineral and anthropogenic dust



Amman during a dust storm (Roya News)

Background

- The DUST-STORM project is a joint interdisciplinary initiative of the University of Rostock, the University of Potsdam, the Free University of Berlin, SESAME and Jordan Universities, with the PhD scholarship support of the German Academic Exchange Service (DAAD).
- DUST-STORM initiative wants to reinforce international academic co-operation and educate and train young MSc level students from Jordan to pursue their PhD in the framework of DUST STORM in Germany.

Scientific Motivation and Regional Implication for Jordan

- Dust storm events in the Middle East, and particularly in Jordan, cause air pollution episodes which are constituting serious health issues.
- Inhalable atmospheric mineral dust is linked to an increased morbidity and mortality due to cardiovascular and respiratory effects (Renzi et al. 2018).
- Toxicological studies coupled with comprehensive physico-chemical analyses are imperative to deeply understand the health-related impact of inhalable dust.

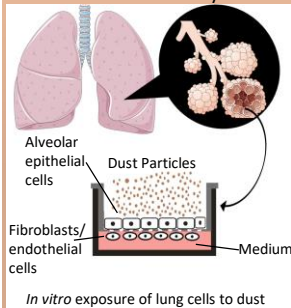
Project Goals

Comprehensive investigation of the physico-chemical properties as well as the biological adverse effects of inhalable dust particles

Collection of dust samples

Biological Analysis (University of Rostock, Helmholtz Zentrum München)

- Submersed and air-liquid interface exposure of lung tissue models to the dust particles followed by evaluation of cytotoxicity, genotoxicity, oxidative stress and epigenetic modification analysis.



Contact

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Chemical Analysis (University of Rostock, Helmholtz Zentrum München)



- Identification and quantification of organic content and elemental composition.
- State-of-the-art thermal analysis techniques hyphenated with laser ionization mass spectrometry.
- Comprehensive gas chromatographic methods
- High resolution mass spectrometry approaches.

Physical Characterization (University of Potsdam, The Free University of Berlin, HZB, SESAME)

- Structural characterization at the powder diffraction (XRD) and extended X-ray absorption fine structure (EXAFS) beamlines.
- Analysis of the outer and possible inner nanostructure with small-angle X-ray scattering (SAXS und ASAXS) at BESSY II
- electronic structure analysis using near-edge X-ray absorption fine structure (NEXAFS), photoelectron spectroscopy (PES), and X-ray emission (XES) at BESSY II and SESAME

Partners

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DUST STORM PhD Students

Biology:

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Chemistry and Physics:

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