

Aerial dust from the „Beagle“ still alive?

About „meteor dust“ sent by Charles Darwin to Christian Gottfried Ehrenberg

Anna A. Gorbushina<sup>1</sup>, William J. Broughton<sup>2</sup>, Renate Kort<sup>1</sup>, *Wolfgang E. Krumbein*<sup>1</sup>, David Lazarus<sup>3</sup> and Anette Schulte<sup>1</sup>

<sup>1</sup> Geomicrobiology, ICBM, Oldenburg University, <sup>2</sup> LBMPs, Department of Plant Biology, Geneva University, <sup>3</sup> Museum of Natural History of the Humboldt University (Berlin)

Introduction. In the years between 1812 and 1867 Christian Gottfried Ehrenberg, founder of aerobiology, received numerous samples of atmospheric dust collected by friends and colleagues all over the globe. The majority of these samples were collected over oceans and present the earliest systematic sampling of dust particles on their inter-continental travel. Desert dust particles are known as vehicles for the spread of lithosphere inhabiting microbial communities through natural atmospheric pathways on our planet. With new interest in the global impact of aerial dust on the inter-continental distribution of organisms, nutrients, and diseases the importance of studies on this unique collection cannot be underestimated. We have started to study the microbiology of atmospheric dust samples collected between 150 and almost 200 years ago.

Materials and methods. 15 dust sub-samples from the Ehrenberg collection at the Museum of Natural History of the Humboldt University (Berlin) were taken aseptically. The samples were further sub-divided for: (i) light microscopy; (ii) scanning electron microscopy (SEM); (iii) cultivation, and; (iv) molecular techniques (microbial community diversity).

Results. Light microscopy and SEM of original and especially re-wetted (hydrated) dust samples clearly showed that numerous bacterial and fungal elements including spores and even sporangia are attached to individual dust particles. Most dust particles from two Passat samples taken in 1832 by Charles Darwin over the Atlantic are void of biological traces, while other particles of the same sample exhibit bacterial and fungal cells including characteristic spores. Samples contaminated in the museum by inappropriate storage were not observed. Cultivation (iii) and molecular ecological (iv) analyses are underway but will not be reported here.

Conclusion. Multidisciplinary studies of dust-associated microorganism transport are still rare because of the complexity of the phenomenon and challenging investigation techniques. Atmospheric dust samples, examined carefully at the time of sampling can be re-examined after 150 years by blending both traditional and novel investigation methods. The dust samples collected by Charles Darwin, Christian Gottfried Ehrenberg, Alexander von Humboldt, Sir Robert Schomburgk, and Charles Lyell almost 200 years ago can thus serve as a valuable source of information on the microbial component of atmospheric dust on its inter-continental travel. This collection offers a unique resource for further tracing the global dispersal of living organisms and potential changes in climate and meteorological conditions.

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