BayCEER Kolloquium

Lectures in Ecology and Environmental Research

WS 2018/19

UNIVERSITÄT BAYREUTH

Thursday
29.11.2018
12:00 in H6, GEO

Prof. Dr. Michael Pester

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& Technical University of Braunschweig

New aspects of microbial sulfur cycling: from novel sulfate reducers to pyrite-forming microorganisms

In my talk, I will highlight two recent findings of my laboratory: the metagenomics-based discovery of putatively novel sulfate reducers and the enrichment of microorganisms performing the Wächtershäuser reaction in syntrophy with methanogenic Archaea.

1. The majority of microorganisms is still uncharted land and for a good reason called microbial dark matter. Analyses based on the functional marker genes *dsrAB* (coding for the dissimilatory sulfite reductase) are often used to characterize sulfite and sulfate reducers and revealed at least 13 uncultured family-level lineages. Many of these lineages can be encountered in freshwater wetlands, which are characterized by cryptic sulfur cycling. I will present how we used environmental systems biology of rice paddy soil to identify and study the physiology of such novel microorganisms.

2. The exergonic reaction of FeS with H_2S to form FeS_2 (pyrite) and H_2 was postulated to have operated as an early form of energy metabolism on primordial Earth. Since the Archean, sedimentary pyrite formation played a major role in the global iron and sulfur cycles, with direct impact on the redox chemistry of the atmosphere. To date, pyrite formation was considered a purely geochemical reaction. I will present how an isolation process of >20 years and modern chemical analytics can be combined to obtain and characterize a microbial enrichment culture, which grows solely with FeS, H_2S, and CO_2 as substrates to produce FeS_2 and CH_4.

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The lectures are an inter-disciplinary platform for students, junior and senior scientists. Abstracts and further information: www.bayceer.uni-bayreuth.de/kolloquium/