Delving into 3.2 billions of years of evolution: Hydrothermal vents and earliest life on Earth

Jan-Peter Duda and a new Emmy Noether junior research group in Tübingen will investigate the geobiology of modern and ancient hydrothermal springs in the deep sea

Dr. Jan-Peter Duda was awarded an Emmy Noether Grant by the *German Research Foundation* (*DFG*). The Emmy Noether Program gives exceptionally qualified early career researchers the chance to qualify for the post of professor at a university by leading an independent junior research group. Jan-Peter Duda will receive a funding of almost 1.9 million Euro over the next six years to establish a new junior research group at the Department of Earth Sciences at the *University of Tübingen*. His team will be associated with the Geomicrobiology Group of Prof. Dr. Andreas Kappler at the *Center for Applied Geosciences* (*ZAG*) and investigate the geobiology of modern and fossil deep-sea hydrothermal systems. It is intended to link the related research activities to the DFG Priority Program (SPP) 1833 "*Building a Habitable Earth*".

Where and under what conditions did life on Earth originate? At first glance, conditions at deep-sea hydrothermal springs such as black and white smokers may appear extreme (e.g. temperatures of up to approx. 400°C, no sunlight) and inhospitable or even hostile to life, but in fact such systems host diverse biological communities today and might have also played a key role in the early evolution of life. The geological record of these primordial systems ranges back to at least 3.2 billion years and could thus help to answer many fundamental questions regarding the origin of life. Despite this enormous importance, however, the geobiology of ancient deep-sea hydrothermal springs has barely been investigated. This is mainly due to the fact that most traces of life are of limited stability and do not survive long over geologic time scales.

Jan-Peter Duda's junior research group will investigate the geobiology of selected modern and ancient hydrothermal systems. The main focus will be on rock structures, mineral associations and organic molecules that form through microbial activity and can potentially be preserved for billions of years ("*biosignatures*"). The results will directly be applied to reconstruct the fundamental geobiology of ancient deep-sea hydrothermal springs (e.g. microbial communities, prevailing environmental conditions, interaction between microbial life and physicochemical processes). Particularly the analysis of the oldest known deep-sea hydrothermal spring deposits will greatly contribute to our understanding of where and under which conditions life on our planet might have originated – and at the same time support the search for possible extraterrestrial life.

Jan-Peter Duda studied geosciences at the *University of Bremen* and obtained his doctorate at the *Georg-August-University of Göttingen* (*GAUG*). During his doctorate, he spent six months at the *Nanjing Institute of Geology and Palaeontology (NIGPAS)* of the *Chinese Academy of Sciences* (CAS; PR China), supported by a scholarship of the *German Academic Exchange Service* (*DAAD*). Afterwards he continued his research at the *GAUG* as well as within the framework of the research commission "*Origin of Life*" of the *Göttingen Academy of Sciences*. During this time, he also spent a year at the *University of California Riverside* (USA), which was financed by a research grant from the *DFG*. At the *University of Tübingen*, Jan-Peter Duda's junior research group will join the long tradition of innovative geoscientific and palaeobiological research.

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