High-resolution monitoring of deep-sea wood falls fill the gap between in situ conditions and microcosm experiments

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Wood falls form dynamic networks of habitats suitable to organisms relying on chemosynthesis, on the photosynthesis-deprived deep seabed. Wood-fall ecological studies have developed on to main strategies, 1) sampling of natural/experimental wood falls discretely distributed on the seafloor and 2) laboratory microcosms experiment allowing the continuous monitoring of microbial communities and chemical conditions. Both approaches have advantages and disadvantages. While the first approach provides information on the biogeography and the diversity of wood-associated communities as function of the wood type, size and over a broad range of depth, the second enable to monitor the establishment of the chemosynthetic communities with fine-scale temporal resolution. In the lab, we have thus reproductively observed the development of sulfidic conditions combined with the development of a chemoautotrophic biofilm that could be monitored over a timescale of weeks, that has not been accessible in situ so far. The combination of autonomous electrochemical sensors and cameras has opened a new step in the capacity to investigate the early steps of wood immersion at high resolution directly in situ. This presentation will provide insights into the rapid changes that were documented using this experimental set up deployed in a deep-sea submarine canyon, revealing the tight interplay between microbial communities and wood fauna within the first months of wood immersion in the deep-sea.