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sunken wood habitat for thiotrophic symbiosis in mangrove swamps

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Degrading organic matter accumulated on the seafloor can lead to sulfide production and allow the development of sulfide-oxidizing organisms, as it was observed for whale bones. Similarly, wood accumulation on the seafloor was expected to sustain local sulfide enrichments, and it was hypothesized that some wood-associated organisms may rely on sulfide-oxidation.

In this study we combined *in situ* chemical monitoring (pH and sulfide) using an autonomous probe, and analyses of sunken wood associated fauna (by SEM observations and Fluorescence *In Situ* Hybridization experiments) in an environment abundantly supplied with wood falls: the mangrove swamp. The primary aim of this investigation was to determine whether sunken woods could constitute suitable sulfidic habitat for thiotrophic symbioses.

Although lower than the millimolar sulfide concentration in the first centimetre of the sediment, *in situ* measurements revealed significant sulfide enrichment on spots at the wood surface while no trace of sulfide was detected in the overlying water. A 72 hour sequence measurements furthermore revealed the fluctuation over time of the sulfide levels (0.1 to $>$100 μM), with different frequencies.

Some protozoans (*Zoothamnium niveum* and *Vorticella* sp.) were observed on the surface of the wood. SEM observations and FISH experiments revealed their association

with ectosymbiotic bacteria. Although the precise nature of their symbionts still remains to be determined, they are most likely sulfide-oxiders, as shown for these ciliates in more ephemeral mangrove sulfidic habitats. Our results confirm the hypothesis that sunken wood in the mangrove swamp represent a suitable habitat for chemosymbiosis, strengthening the hypothesis that chemosymbiosis could be sustained by sunken-wood in deeper environments.