

## **A novel microbial habitat from a submarine volcano hosts a large and undiscovered yet biodiversity**

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### **Abstract**

Microbes are the most abundant biological component of marine ecosystem at global scale, playing a key role in biogeochemical cycles and organic matter recycling. At the same time, microbes have been also recently recognized as habitat-forming species, as they are able to create large 3D structures that increase the complexity of the substrate, enhancing the number of available niches and consequently hosting a large biodiversity. The present study focuses on a novel microbial habitat discovered on top of a shallow-water active submarine volcano (Western Pacific Ocean), which exploits the fluid seepage present on its summit. This is a “microbial forest” habitat type in which we described and characterized the habitat former at the genomic and morphological levels, as well as the associated biodiversity. We show that this novel microbial forest is primarily built by a benthic filamentous cyanobacterium. The filaments are clearly visible to the naked eye and add a new ecological volume that can be exploited by several organisms, possibly including other unknown species specifically adapted to the extreme conditions of the seepages. The rich biodiversity associated to this microbial habitat included, besides other prokaryotic taxa, protists, and a large number of metazoan taxa (including their larvae and juveniles), micro- and macroalgae, that find in this habitat refuge, nursery, recruitment and reproductive sites.