An oasis in an ocean desert

Along Tonga's volcanic arc, off the coast of New Caledonia, a highly productive major fishing zone has been identified in the vast ocean "desert" of the tropical Pacific. A mysterious phenomenon brought to light by oceanographic research.

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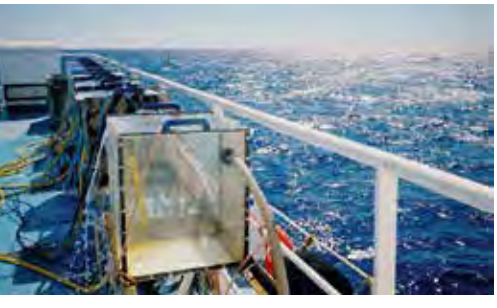
Samples of plankton strains, Mediterranean Institute of Oceanology, Marseille.



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Plankton incubators, Tonga.

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Off the coast of the Tongan Islands, scientists have discovered an area of high biological productivity with a surface area two to three times the size of France. This is somewhat unusual in this region of the Pacific, where the waters are reputed to be poor, encouraging the scientists to examine the area as part of an oceanographic campaign.

Here beneath the surface of the water lies a 2,000 km long chain of undersea mountains. It was created by the convergence of the Pacific and Australian tectonic plates, and is riddled with active volcanoes. Some are very deep, but others lie close to the surface, releasing their iron-rich hydrothermal fluids at depths of between 200 and 50 metres. This enriches the surface layer of the ocean, which otherwise lacks this essential nutrient. According to physical, chemical and biological analyses, the surface waters around active volcanoes contain ten times the normal concentration of dissolved iron. This element is essential for diazotrophic cyanobacteria to fix atmospheric nitrogen dissolved in the water and make it available to plankton. This constant and sustained supply of iron dating back thousands of years from the dozens of shallow volcanoes in Tonga's volcanic arc explains the vast plankton blooms that cover an area of 360,000 km^2.

This plankton, which is also photosynthetic, fixes the CO_2 dissolved in seawater. The results of this research showed that this oasis of life contributes to the absorption of atmospheric carbon in the ocean depths (> 1,000 m). This process, which has only recently come to light, is now the subject of in-depth research involving the sampling

••• In the Pacific, shallow hydrothermal springs produce massive plankton blooms that can be detected by satellite •••

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Plankton scanner analysis, Mediterranean Institute of Oceanology, Marseille.

of data transmitted by an intelligent profiling buoy equipped with autonomous high-tech sensors powered by solar and wind energy, which can scan the ocean both at the surface and at depth.

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