CHEMISTRY

Autonomous and sequenced hydrothermal fluid sampling device

A hydrothermal fluid is an aqueous solution loaded with metals and gases, generated by the circulation of seawater through the oceanic crust.

Heated by the magmatic chamber which generate the oceanic accretion, the substances and energy flows brought by fluids play a vital role for the organisms that proliferate in deep marine ecosystems.

The challenge is to be able to assess resources and biodiversity, but also to monitor and preserve these environments.

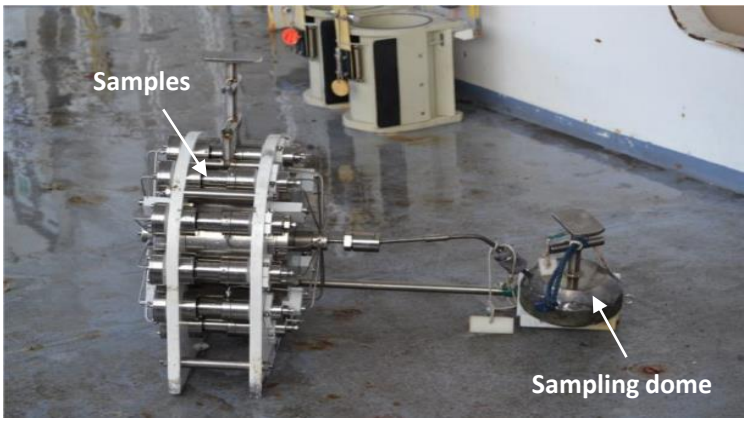
DESCRIPTION*

This technology is the only device in the world for studying the dynamics of high temperature hydrothermal fluids in deep marine environments.

Designed and manufactured by the GET laboratory and Top Industrie workshops, the DEep sea Autonomous Fluid Sampler (DEAFS) is the first prototype of autonomous module to collect and store, at regular time intervals and autonomously, hydrothermal fluids in extreme heat and pressure conditions.

As a breakthrough technology, the DEAFS will allow advances in the scientific knowledge of the deep ocean, ecosystems and resources.

The DEAFS has been tested in-situ for 15 months and have been removed from the seabed in September 2020. Samples analysis are in progress.



Prototype of DEep sea Autonomous Fluid Sampler (DEAFS)

TECHNICAL SPECIFICATIONS

Extreme conditions	400 bars, 400°C and pH ~ 3
Sampling capabilities	12 samples of 50ml each

* Technology requiring license rights.

TOULOUSE TECH TRANSFER

COMPETITIVE ADVANTAGES

- Autonomous device
- Regular monitoring of the chemical composition of deep-sea water
- Robust under extreme conditions

APPLICATIONS

- Monitoring the dynamics of hydrothermal activity
- Exploration of mineral resources

INTELLECTUAL PROPERTY

- Published patent

DEVELOPMENT STAGE

- Prototype tested in operational environment

1 2 3 4 5 6 **7** 8 9

- Tested for 15 months in a real environment - Lucky Strike Hydrothermal Field. Analysis of samples in progress) EMSO-Azores deep-sea observatory

LABORATORY

- (GET) CNRS-UPS-IRD:

GÉOSCIENCES ENVIRONNEMENT TOULOUSE

- In collaboration with:

TOP INDUSTRIE
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