High-Temperature Borehole Fluid Sampler

BACKGROUND

Deep boreholes (>1km depth) already exist or may be created in oceanic crust, samples from which can be used for a variety of microbiological, hydrologic, and/or biogeochemical discoveries. Temperatures at oceanic boreholes may reach extremely high levels (~190°C), making reliable sampling at the boreholes very difficult. To study in situ conditions within these challenging environments, a new array of sensors and samplers are needed as standard electronics do not typically function above 150°C.

DESCRIPTION

Inventors have developed the Multi-Temperature Fluid Sampler (MTFS), which is a non-gas-tight, syringe-style fluid sampler that employs a mechanical trigger that utilizes the thermal-response properties of a shape memory alloy. The MTFS affords a versatile array of experimental possibilities, including taking multiple samples during a single wire lowering, with each sampler set at a particular temperature range.

ADVANTAGES

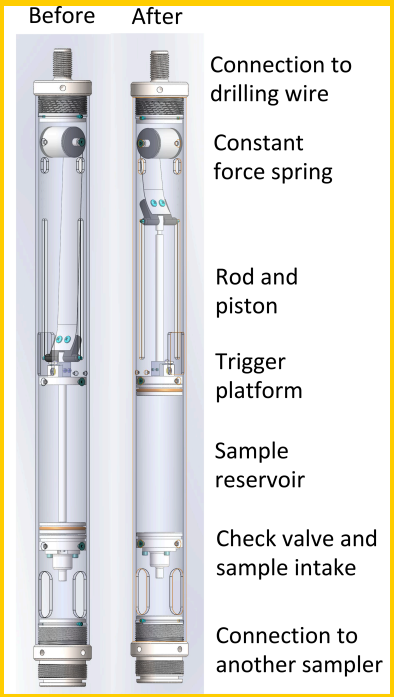
- Durable, reliable, and reusable
- Inexpensive and easy-to-operate
- Versatile with possibility of multiple samples at multiple temperature settings

APPLICATIONS

- Sampling at high-temperature boreholes
- Scientific research
- Petroleum discovery

PUBLICATION

Wheat, C.G., et al. (2020, December). A New High-Temperature Borehole Fluid Sampler: The Multi-Temperature Fluid Sampler. *Scientific Drilling*, 28, 43-48. doi: 10.5194/sd-28-43-2020



Borehole fluid sampler.

Multi-temperature fluid sampler.

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