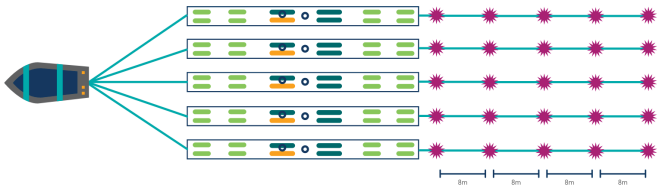
Deep Sea Minerals AM20 Seismic Test Case

New Seismic 3D Technology Optimized for DSM Exploration

NORWEGIAN SEA

New acquisition technology, including world record ten simultaneous (SIM) sources, is currently being processed. The test was acquired in conjunction with the AM20 3D project in the Norwegian Sea in similar water depths and test analogs shallow targets simulating small sulfide complexes. Additional tests using the same acquisition specifications are planned for 2021 on real sulfides within the Mohn's Ridge area in a non-profit academic cruise designed, partnered, and operated by the University of Bergen.



The diagram above shows the gun configuration as set-up by Apparition Geoservices and performed by the Polarcus Adira vessel assigned to this test. A total of 10 individual, almost simultaneous, sources (SIM) on five gun-strings were fired with signal apparition encoding (SA). The source streamer separation matched a conventional seismic survey that was also being acquired in the area, named AM20. This arrangement resulted in an 8 x 50-meter source pattern that is more than four times the number of traces per area than for the already dense Penta source used in the conventional AM20 survey acquisition.

The figure below shows very preliminary results, still not using the data's full potential, demonstrating a significant rise in higher frequencies. This improved high-frequency signal and dense spatial coverage are required to identify expected small commercial size extinct sulfide complexes of a few hundreds of meters across and tens of meters deep, located at the seafloor or just below.

Finding the needles in the haystack

Expectations for the Mohn's Ridge area, a northern Atlantic spreading center, is that the small (in seismic scale) sulfide complexes are widely spread and few-and-far-between. Scientific work done on sulfide complexes in the Mid-Atlantic TAG site shows good seismic targets in contrast to underlying basalts. Therefore, there is a compelling argument for a seismic exploration program, such as modern 3D seismic, to locate and conduct first-order analyses of the sulfide volumes present in each complex. This test on seismic analogs and a coming test in the Mohn's Ridge area is in advance of anticipated 3D seismic programs in the order of 20,000 sq. km in preparation for a licensing round expected in 2023.