



## **Three-dimensional Geometry of Magma Chamber Roof and Faults from 3D Seismic Reflection Data at the Lucky Strike Volcano, Mid-Atlantic Ridge**

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A three-dimensional (3D) seismic reflection survey was carried out during the SIS-MOMAR 2005 experiment covering an area of  $18 \times 3.8 \text{ km}^2$ , which includes the Lucky Strike volcano and associated hydrothermal vent sites, part of the graben on top of the volcano, and extends out to the median valley bounding faults. The survey consisted of 39 lines shot at 100 m spacing using a 4.5 km-long streamer resulting in a sixty-fold coverage and 6.25 m CDP spacing. We present here the resulting 3D time migrated volume that shows a bright reflector at about 3 km depth beneath the volcano, which is interpreted as the roof of a magma chamber, along with the base of layer 2A. We were also able to image faults on the volcano and bounding the median valley, some of which penetrate down to the vicinity of the magma chamber. We also provide the 3D geometry of the magma chamber roof and base of layer 2A, converted to depth using the velocities from the 3D refraction survey (Seher et al., same session), and a high-resolution seafloor bathymetric map derived from the picks of the seafloor arrival.

The 3D geometry of the magma chamber and faults, along with the overlying tectonic and accretion expressions at the seafloor provide new insights into the interplay between magmatic and tectonic processes at slow spreading ridges. By constraining the heat source and probably the main fluid paths locations, these results also provide a geometric pattern for the hydrothermal circulation feeding the vents.