Stable isotope geochemistry of carbonate-brucite chimneys and vent fluids from Lost City Hydrothermal Field, 30°N MAR

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The discovery of the Lost City Hydrothermal Field (LCHF) in 2000 led to the recognition of a novel type of vent system at slow-spreading mid-ocean ridges. These systems are low-temperature, high pH, and associated with the serpentinization of peridotites exposed at the seafloor by long-lived detachment faults. The LCHF has been the subject of numerous scientific investigations since its discovery, including the recent IODP Expedition 357 to the Atlantis Massif, which hosts the LCHF (30°N, MAR). In 2018, we returned to the LCHF with Remotely Operated Vehicle *Jason* to collect large volumes of vent fluids and actively venting chimney samples. In this contribution we discuss the carbon, oxgen, and sulfur stable isotope geochemistry of the fluids and the carbonate-brucite chimneys from the main vent field. Samples were collected from previously documented and newly discovered venting chimneys, as well as from fissures on a NE-SW trending wall northeast of the main field. In general, the sulfur isotope composition of sulfate in the vent fluids is depleted in ^{34}S compared to the coexisting sulfide. The carbon isotope composition of chimney samples are generally within the range of marine carbonates but highly heterogeneous on small scales. The carbonates collected from the wall are generally more enriched in ^{18}O than samples from the main vent field, consistent with a lower temperature of deposition. This isotope data will be coupled with detailed mineralogical analyses of the deposits to contribute a more comprehensive understanding of subsurface processes at LCHF and ultimately of the geochemical evolution of this system.