

**Table 1.** Isotopic compositions and  $^{14}\text{C}$  ages of sedimentary rocks, hydrothermal deposits, and vent fluids at the Atlantis Massif. Depths are reported as meters below sea level.  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  values of the carbonate material are in ‰ relative to the Vienna Pee Dee Belemnite standard;  $\delta^{18}\text{O}$  values of the

vent fluid are relative to the Vienna Standard Mean Ocean Water standard (12). AMS  $^{14}\text{C}$  ages are conventional radiocarbon ages, uncorrected for reservoir ages. Mineral abbreviations: cc, calcite; arag, aragonite; bru, brucite;  $T$ , temperature.

Sample	Depth	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	$^{14}\text{C}$ Age	AMS ref. no.	$^{87}\text{Sr}/^{86}\text{Sr}$	Sample details
<i>Vent samples</i>							
3651-0908B	844	1.4	1.7	$25120 \pm 210$	ETH-26138		Gray extinct chimney; cc, high-Mg cc
3651-0938W	786	1.6	4.5	$11820 \pm 85$	ETH-26139	0.70866	White extinct chimney; arag, cc
3651-0944	785	2.2	3.8	$300 \pm 35$	CAMS-95436	0.70799	Feathery white deposit from fissure; arag, cc, bru
3651-1022	731	1.6	2.2	$50 \pm 45$	ETH-26397	0.70760	Active vent, $T = 75^\circ\text{C}$ ; white botryoidal deposit; arag, bru
3651-1123	799	2.4	4.5	$970 \pm 35$	CAMS-95437	0.70908	Small pinnacle from talus; arag, minor microfossils
3651-1149	792	2.0	3.9	$195 \pm 45$	ETH-26396	0.70793	Active vent, $T = 55^\circ\text{C}$ , friable white material; arag, bru
3651-1231	731	2.4	4.0	$585 \pm 35$	CAMS-95438	0.70896	White porous sample from inactive tower; arag, cc, minor microfossils
<i>Pelagic limestones, breccias, and infillings</i>							
3641-1549A	1794	1.5	2.9	$34100 \pm 400$	ETH-26401		Fossil-rich, bedded pelagic limestone
3645-1145C	957	2.7	4.6	$30930 \pm 310$	ETH-26399		Carbonate (cc/Mg-rich cc) matrix in basaltic breccia
3648-1534B	947	3.2	5.2	$22060 \pm 220$	ETH-26400		Micritic carbonate in-filling in fractured serpentinite
3648-1545B	920	2.4	1.5	$25430 \pm 170$	CAMS-95435		Carbonate (cc) matrix in sedimentary breccia
3652-1002B	732	2.9	4.7	$25120 \pm 200$	ETH-26398		Micritic carbonate pockets in fractured serpentinite
<i>Veins</i>							
3648-1424N	1084	-2.3	-14.2	$31980 \pm 380$	ETH-26140		cc veins in fractured gabbro
3652-0905V2	863	-2.8	-16.8	$31960 \pm 400$	ETH-26141		cc veins in highly fractured serpentinite
<i>Vent fluids</i>							
3651-1013	731		0.1			0.70697	Active vent $T = 75^\circ\text{C}$
3651-1201A	792		0.0			0.70726	Active vent $T = 55^\circ\text{C}$
3651-1201B	792		0.1			0.70745	Active vent $T = 55^\circ\text{C}$