

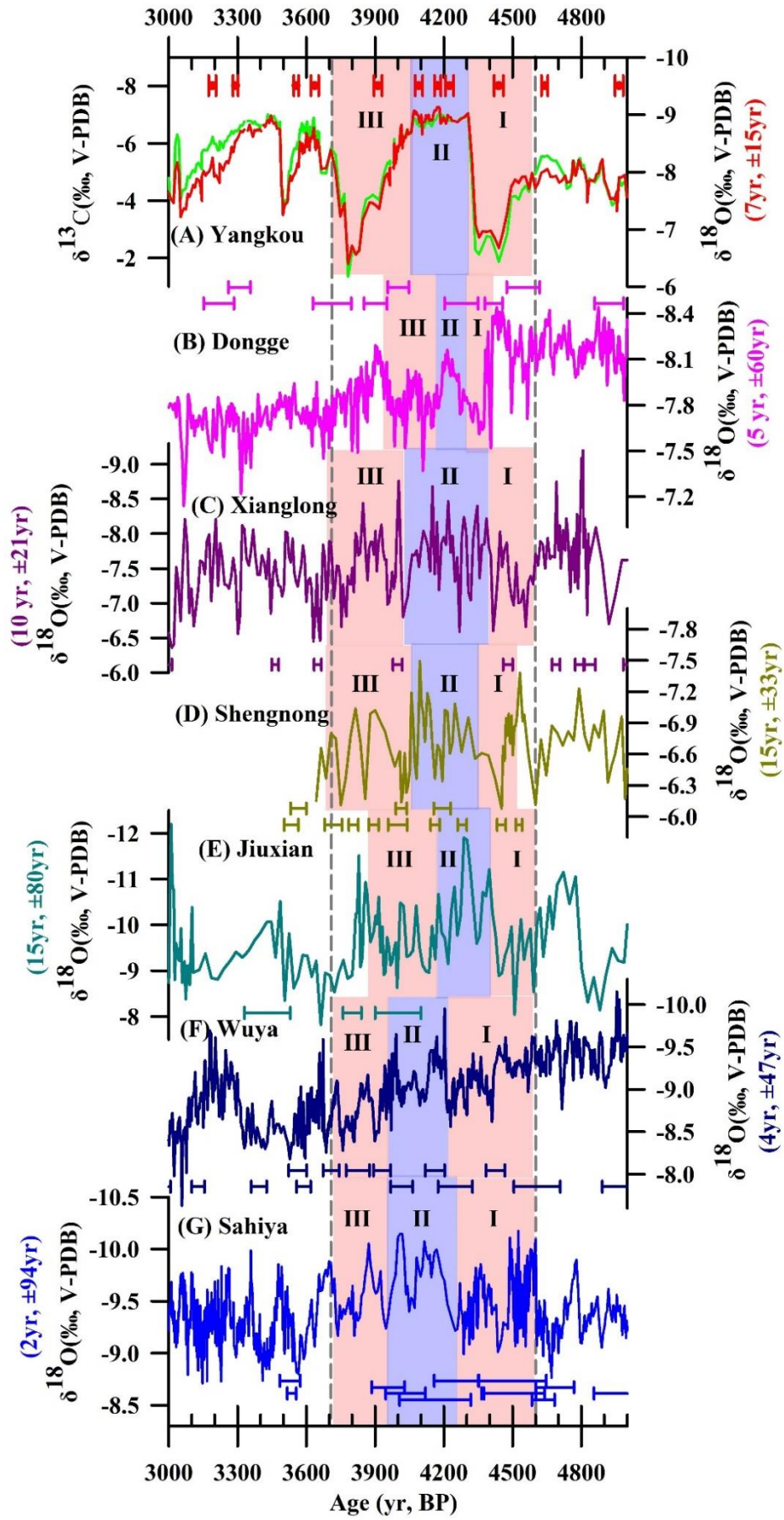
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2 **Figure S1. Comparison with depth of multi-proxies records of stalagmite YK1306.**

3 (A) $\delta^{13}\text{C}$; (B) $\delta^{18}\text{O}$; (C) Ba/Ca; (D) Sr/Ca; (E) Mg/Ca; (F) PC1 is the first principal

4 component of Ba/Ca, Sr/Ca, Mg/Ca. The blue and pink bands represent the three stages

5 during the 4.2 ka event, respectively.



7 **Figure S2. Comparison of stalagmite records in ASM region.** (A) The $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$
8 of stalagmite YK1306 in YK Cave (this study); (B) The $\delta^{18}\text{O}$ of stalagmite in DG Cave
9 (Wang et al., 2005); (C) The $\delta^{18}\text{O}$ of stalagmite XL Cave (Tan et al., 2016); (D) The
10 $\delta^{18}\text{O}$ of stalagmite SN Cave (Zhang et al., 2018); (E) The $\delta^{18}\text{O}$ of stalagmite JX Cave
11 (Cai et al., 2010); (F) The $\delta^{18}\text{O}$ of stalagmite in WY Cave (Tan et al., 2020); (G) The
12 $\delta^{18}\text{O}$ of stalagmite in SHA Cave (Kathayat et al., 2017). The numbers in brackets
13 represent the resolution and the average dating error respectively. The same color error
14 bars represent its dating error. The blue and pink bands represent the three stages (I–II–
15 III) during the 4.2 ka event, respectively.

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26 **Table S1.** The correlation between multi-proxies ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$, Ba/Ca, Sr/Ca and Mg/Ca)
 27 of stalagmite YK1306 and PC1. The $\delta^{13}\text{C}$, $\delta^{18}\text{O}$, Ba/Ca, Sr/Ca and Mg/Ca were
 28 normalized by Z-score method. The $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ were interpolated into the same time
 29 series as trace elements by linear interpolation.

	Mg/Ca	Ba/Ca	Sr/Ca	$\delta^{13}\text{C}$	$\delta^{18}\text{O}$	PC1
Mg/Ca	1.00					
Ba/Ca	0.17	1.00				
Sr/Ca	0.22*	0.89**	1.00			
$\delta^{13}\text{C}$	0.37**	0.24*	0.05	1.00		
$\delta^{18}\text{O}$	0.37**	0.37**	0.21*	0.96**	1.00	
PC1	0.48**	0.92**	0.94**	0.24*	0.37**	1.00

30 * There was significant correlation at the level of 0.05.

31 ** There was significant correlation at the level of 0.01.

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