



Paleomonsoon and paleoenvironment changes during the past 3000 years in Guizhou, China: speleothem $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ records

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An 18-cm long stalagmite, JG-2, was collected from Jiguan Cave in Guizhou province, China. Four $^{230}\text{Th}/\text{U}$ dates at depths of 3.8-4.2, 6.8-7.4, 12.1-12.5, and 17.1-17.5cm are 70 ± 60 , 1010 ± 35 , 1565 ± 180 and 2455 ± 170 years respectively, determined by a TIMS facility in the Isotope Lab at the University of Minnesota in 1998. As the stalagmite was still alive during the collection and appeared no growth hiatus, we apply linear deposition rates between the $^{230}\text{Th}/\text{U}$ dates for chronology reconstruction, and expect to refine the chronology with more dates in the near future. We have sub-sampled the stalagmite at 0.25 mm interval and analyzed 718 samples for $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$. The $\delta^{18}\text{O}$ values range from -8.21 to -6.01 (PDB) with an average of -7.151. The $\delta^{13}\text{C}$ values vary between -131 and -101 with an average of -11.271, showing generally positive correlations with the $\delta^{18}\text{O}$ record throughout time except the intervals of 110-140mm and 165-177mm depths. For the past 2600 years, the $\delta^{18}\text{O}$ record of JG-2 is generally similar to the published Dongge record from the same region (Wang et al., 2005) especially for the last 600 years, but the inter-annual variability of the $\delta^{18}\text{O}$ signal in JG-2 is much smoother. Based on the current chronology, strongly negative $\delta^{18}\text{O}$ swings occurred around 2300, 1900, 1550, 1250, 1050, 800 and 150 yr BP with values significantly lighter than the average value of the entire record, probably indicating strengthening of the summer monsoon in Guizhou. During periods of 2200-2000, 1800-1600, 1500-1300 and 800-500 yr BP, the $\delta^{18}\text{O}$ values of JG-2 record

appeared significantly heavier than the average $\delta^{18}\text{O}$ value, implying weaker summer monsoons in the region. The most outstanding feature of the record is that both $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ continuously decrease from ~ 600 yr BP to ~ 200 yr BP, which resembles the Dongge record. Such decreasing trends reflect wetter climates and better vegetation coverage perhaps corresponding to strengthening of the summer monsoon.