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Imprint of solar activity on Nanjing stalagmite annual layer thickness sequence during the Last Glacial Maximum

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A 3000-year-long stalagmite chronology from Hulu Cave near Nanjing was established by counting annual layers under microscope. Based on the ^{230}Th ages, the chronology covers the period 24-21 kaBP, within the Last Glacial Maximum (LGM). Two proxies, annual layer thickness and gray level were measured along the growth axis of the stalagmite profile in order to establish a high-resolution East Asian monsoon history during the LGM. The high correlation coefficient (r=0.55) between the two proxies (Fig.1) suggests that both of them were controlled by a common factor, possibly reflecting changes in the strength of summer monsoon circulation and its precipitation. Low frequency variations of the annual layer thickness, ranging from centennial to millennial scales, are approximately in agreement with the ^{10}Be-flux recorded in the Greenland ice core, indicating that changes in East Asian monsoon strength might be forced by solar outputs during the LGM periods. In support of this, Fourier power spectrum analysis of the annual layer thickness showed certain decadal to centennial-scale cycles that agree well with the periodicities of solar activity.