

## Age and long-term cooling effect of late Permian Emeishan LIP volcanism

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Pedogenic carbonate paleobarometer data in combination with modelling demonstrated a silicate weathering related million year-scale reduction of atmospheric pCO<sub>2</sub> after the eruption of Central Atlantic Magmatic Province (Schaller et al. 2012), consistent with the modelling result for the Deccan Trap (Dessert et al., 2001), resulting in a net long-term climate cooling effect. We here present high-precision zircon U-Pb dating and climate proxy data to test this weathering-induced climate cooling hypothesis for the Emeishan Large Igneous Province in South China.

CA-TIMS analysis gave a zircon U-Pb age of 259.51±0.21 Ma for one felsic tuff sample from the top Pu'an volcanic sequence. This age, together with one CA-TIMS age for the rhyolites in the top Binchuan sequence (Zhong et al., 2014), constraints the timing of Emeishan volcanism and overlaps with one zircon CA-TIMS age for the bottom of a Late Permian sedimentary sequence dominated by Emeishan volcanic-derived lutites. Based on high-resolution mudstone sampling, we obtained a source chemical weathering (CIA, chemical weathering index of alteration) trend and an organic carbon isotopic ( $\delta^{13}\text{C}_{\text{org}}$ ) curve. There shows an significant positive excursion (~2‰) in  $\delta^{13}\text{C}_{\text{org}}$  value along with a large decrease (~20) in CIA value in the early Wuchiapingian. The  $\delta^{13}\text{C}_{\text{org}}$  value then gradually decreases upward with several small-scale fluctuations and CIA value is generally low but with three high peaks, which generally correlates with  $\delta^{13}\text{C}_{\text{org}}$  negative excursions. These data are in agreement with the hypothesis and suggest an long-term atmospheric pCO<sub>2</sub> decrease and an associated climate cooling following the emplacement of the Emeishan volcanic province.

### References cited:

- Dessert, C. et al., 2001. *Earth and Planetary Science Letters*, 188: 459-474.  
Schaller, M.F. et al., 2012. *Earth and Planetary Science Letters*, 323-324: 27-39.  
Zhong, Y.-T. et al., 2014. *Lithos*, 204: 14-19.