

## **Clumped isotope depositional temperatures from Palaeoproterozoic fine-agglutinated and microdigitate stromatolites: ~1.9 Ga Vempalle Formation, Cuddapah Basin, India**

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The ~1.9 Ga [1] Vempalle Formation of the Cuddapah Basin, southern India, contains peritidal carbonates with well-preserved diverse stromatolites. Here we report stable isotope and clumped isotope analyses of three different morphotypes of Vempalle stromatolite from the Kadri-Pullivendla road section: Type I (thickly layered, domal), Type II (finely layered, columnar), Type III (microdigitate). The resemblance of fabrics of Type II stromatolites to ~1.4 Ga examples in North China [2], suggests that these Vempalle examples may be the oldest confirmed fine-agglutinated stromatolites currently known. We analysed  $\delta^{13}\text{C}_{\text{VPDB}}$  and  $\delta^{18}\text{O}_{\text{VPDB}}$  in dolomitic carbonates and isolated organic matter for the  $\delta^{13}\text{C}_{\text{org}}$ . Our results show that Type I, II and III are indistinguishable in terms of  $\delta^{13}\text{C}_{\text{VPDB}}$  and  $\delta^{18}\text{O}_{\text{VPDB}}$ . However,  $\delta^{13}\text{C}_{\text{org}}$  values range from -26 ‰ to 23.9‰. Clumped isotopic analysis of Type I indicates a temperature of 66°C and corresponding water  $\delta^{18}\text{O}_{\text{water}}$  -1.56‰, Type II indicates 96°C and  $\delta^{18}\text{O}_{\text{water}}$  2.93‰, and Type III 70°C and  $\delta^{18}\text{O}_{\text{water}}$  -0.42‰.

Refs: [1] Sheppard, et al., 2017, Gondwana Res. 48; [2] Tosti and Riding, 2017, Sedimentology 64.