

Estimation of Dinosaur Body Temperature From Late Cretaceous Sauropod Eggshell From India Using Carbonate Clumped Isotopes

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The thermal physiology of saurischian dinosaurs is a subject of research interest over the years. Here in this study, we have carried out clumped isotope investigation on well preserved late Cretaceous Sauropod eggshell from India. Our preliminary investigation reveals a Δ_{47} based temperature of $39 (\pm 2)^\circ\text{C}$ in CDES scale, similar to the Titanosaurid eggshell investigated by [1] and theoretically predicted value [2]. Clumped isotope study on co eval Crocodile egg shell reveals a temperature of $28 (\pm 4)^\circ\text{C}$. We have also carried out similar investigation on the Australian Emu, Egyptian Ostrich and Antarctic Penguin eggshells of recent to subrecent time frame, which yielded temperatures around $42 (\pm 2)^\circ\text{C}$. It is interesting to note that the $\delta^{18}\text{O}_{\text{water}}$ derived from the sauropod egg shell shows an enriched signature of 4.59‰ in VSMOW scale similar Titanosaurid eggshell investigated by [1]. On contrary co eval Crocodile eggshell captures a freshwater $\delta^{18}\text{O}_{\text{water}}$ signature. Possible scenarios related to palaeo physiological processes and disequilibrium isotope effect will be discussed during presentation to explain the obtained temperature and $\delta^{18}\text{O}_{\text{water}}$ information.

Ref:[1] Eagle et al., 2015, Nat. Communications:[2]
Gilloly et al., 2006, PLOS Bio.