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Late Jurassic palaeoclimate conditions at the southern mid-latitude revealed from the stable isotope analyses of the belemnites

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Paleogeographic configuration, high pCO2 conditions due to volcanisms and tectonic features are factors responsible for the climatic fluctuations during the late Jurassic. Stable isotope analysis on Sub-annual growth bands from fossil shells collected from a Jurassic sedimentary sequence provided a high-resolution record of contemporary climate from the southern Mid-latitude, a position assigned to the Indian plate following the break-up of Gondwana break-up. The southern mid-latitude (~ 30°S palaeolatitude) seasonal climate record is preserved in the isotopic signature of shells collected from two adjacent basins in India; Kachchh and Jaisalmer, located on the northwestern part of the Indian subcontinent. In this study, stable isotope analysis on sub-annual growth bands of four well-preserved belemnite rostra from both basins (two from each basin) is presented. Overall, the belemnites from both basins captured a similar range of δ13C values from -1.06‰ to 0.59‰, with an average of -0.30‰ and denoting the same productivity of the ocean water column. Both the shells from the Jaisalmer basin registered negative δ18O values (-2.60‰ to -0.70‰), indicating a more freshwater contribution to the environment of sedimentation. One of the shells from the Kachchh basin resembles the observed δ18O variability, while the other one recorded higher δ18O values (-0.31‰ to 1.57‰), representing a more evaporative environment. Results obtained from the Kachchh basin are consistent with the bulk analysis of belemnite samples from the basin (1,2). Evidence of extreme climate events and migration of the organisms will be discussed during the presentation.

References: (1) Alberti et al., (2012), Palaeogeography,Palaeoclimatology,Palaeoecology 344-345, 49-58. (2) Fursich et al., (2005), Palaeogeography, Palaeoclimatology, Palaeoecology 217, 289–309.