

Evidence of seasonal freshwater influx and sea surface temperature variation in the Indian Ocean from Miocene (Burdigalian) using Stable isotopes ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$) and Mg/Ca of Mollusks from Kachchh Basin (western India)

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This study is an attempt to interpret the annual temperature and hydrological variations in the western India during the Burdigalian age (Early Miocene). The isotopic and elemental analysis of the seasonal growth bands of bivalve *Lenticorbula trigonalis* (Bivalvia: Corbulidae) (Sowerby 1840) from the Miocene (Burdigalian) sedimentary successions belonging to the Chassra Formation of Kachchh Basin, Gujarat, western India was undertaken. The preservation of shells was assessed using XRD analysis of powder and complemented with FTIR analysis. The results suggest that the analyzed shells have a majority composition of aragonite. The Mg/Ca ratios measured along the growth bands of the specimen shells was used to reconstruct the sea surface temperature of the Early Miocene (Burdigalian). The temperature thus reconstructed ranges from 15.8 to 34.9 °C. The $\delta^{18}\text{O}$ measured along the growth bands varied between -2.6‰ to 1.23‰ VPDB. Further, the $\delta^{13}\text{C}$ values for this taxon vary from -2.9 to -0.8‰ VPDB, the seasonal covariation in $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values reflects seasonal run-off and productivity in the shallow marine depositional environment. The present study interprets the temperature and oxygen isotope variations during the Early Miocene (Burdigalian) age and compares it to the modern-day seasonal and temperature variability in the Kachchh (Kutch) region, in western India, thus providing an understanding about the palaeo-monsoonal system.