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Monsoon induced sea-surface seasonality shifts in the Arabian Sea: Evidence from Isotopic Signals of recent Littoraria Undulata shells (Gastropoda)

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The Asian monsoon is a primary component of the tropical and global climate system. Our ability to forecast monsoon intensity depends on understanding the factors that control monsoon. In this context, oxygen and carbon isotopic analyses of the intertidal gastropod Littoraria undulata (Gray, 1839) were carried out from southwest India to understand the seasonal _18O and _13C changes in the coastal waters. The micro-drilled intrashell carbonate samples and surface waters were analysed for _18O and _13C to reconstruct seasonal hydrographical and biological changes in the Arabian Sea. All investigated gastropod shells show profound post monsoonal 12C depletion, due to increased surface water productivity by primary producers. This shift is up to 3-4‰, which are linked to vertical mixing and upwelling induced by the monsoon winds. In addition, these results indicate that Littoraria undulata mainly utilizes the dissolved inorganic carbon (DIC) pool, compared with carbon of a metabolic origin for its shell aggregation. Sea-surface temperature (SST) estimates based on Grossman and Ku (1986) aragonite equation shows consistent aperture temperatures within ±1°C of observed values. These tentative results tempt to suggest that the _18O and _ 13C data of intertidal gastropod Littoraria undulata can be used as a proxy for high-resolution paleomonsoon reconstructions in the Indian Region.