Title:	Response of grassland ecosystem to monsoonal precipitation variability during the Mid-Late Holocene: Inferences based on molecular isotopic records from Banni grassland, western India
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Abstract:	Banni, located in the arid western India, is one of the largest tropical grasslands of the Asian continent. The net primary production in this grassland ecosystem is currently mediated by precipitation during the Indian summer monsoon (ISM). However, timing of the grassland expansion and its link to the intensity of monsoonal precipitation remains enigmatic due to the paucity of datasets. The major objective of this study is to understand the changes in monsoonal precipitation and vegetation for the last 4600 cal yr BP using hydrogen and carbon isotopic composition of n-alkanes (δDn-alkane and δ13Cn-alkane) measured from two core sediments (Chachi and Luna) in Banni region. The δ13CC29 and δ13CC31 values for Chachi core sediments vary from −30.9 ‰ to −27.2 ‰ and −34.4 ‰ to −25 ‰ respectively. The δ13Cn-alkane values from the core sediments are converted into %C4 plants based on a binary mixing model using the end-member δ13Cn-alkane values derived from the dominant modern vegetation in the Banni region. The prominent feature of the paleovegetation curve is the marked increase in the δ13Cn-alkane values after 2500 cal yr BP, which suggests proliferation of C4 grasses in this region. Similar changes after 2500 cal yr BP have also been observed in the δDn-alkane values. The δDC29 values are used to calculate δD value of paleoprecipitation that varied from 10 ‰ to −60.2 ‰. A significant increase in the δD values of paleoprecipitation (ca. 25 ‰) indicates a weakened ISM precipitation after ca. 2500 cal yr BP. The regional aridification and frequent fire events may have helped the expansion of C4 plant dominated grassland ecosystem in Banni region. Correlation between paleoclimatic records suggests that the southward migration of intertropical convergence zone and more frequent warm phases of El-Nino Southern Oscillation have triggered the weakening of monsoonal precipitation in the tropical region.
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