



Middle to Late Holocene climate, vegetation and sea-level changes in NW Tripura, northeast India, based on palynological and mineral magnetic evidence

Nivedita Mehrotra · Santosh K. Shah ·
Nathani Basavaiah · Ratan Kar

Received: 1 April 2021 / Accepted: 17 May 2022
© The Author(s), under exclusive licence to Springer Nature B.V. 2022

Abstract The sediment deposits of northwestern Tripura, northeast India, revealed the enhanced proximity to the marginal marine environments, forest cover variations and anthropogenic influences. We infer the palaeo-vegetation and palaeo-environmental conditions between 9900 and 1800 cal B.P. through a 1.80 m deep sediment profile, from the remote location of Charilam, Tripura, using biotic (fossil pollen) and abiotic (mineral magnetism) proxies. The sediment profile recorded warm and humid conditions between 8300 and 6200 cal B.P., which later shifted towards less humid phase until 4900 cal B.P. The lower part of the sediment profile provided evidence of enhanced sea-level in this region, as manifested by mangrove taxa found between 9900 and 4900 cal B.P. But later, these taxa were minimal and thereafter, diminished in the sediments during the Late Holocene (4100–1800 cal B.P.). The occurrence of fewer tree taxa and dominance of larger grass pollen signify the enhancement of anthropogenic activities in the region, during the recent times. The shifts in mineral

magnetic content towards fine-grained anti-ferrimagnetic hematite components, as exhibited by relatively high Hard IRM, SIRM/XLF, ARM/SIRM ratio and low S-ratio towards the end of the Middle Holocene, resonate with the climate variations concurrent to the vegetation changes. These interpretations lead to the perception of a reduction in the Indian Summer Monsoon (ISM) strength during the Late Middle Holocene. The inception of anthropogenic activities has also induced the changes in the vegetation cover, leading to increased soil erosion and land-use changes during the Late Holocene in the region, which are well observed in the pollen and mineral magnetic records. This study focuses on multi-proxy analyses of the Holocene sediments in this part of northeast India, which has no such previous records.

Keywords Mid Holocene · Palaeo-vegetation · Palaeo-environment · Fossil pollen · Remnant mineral magnetism · Relative sea-level · Tripura

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10933-022-00249-6>.

N. Mehrotra (✉) · S. K. Shah · R. Kar
Birbal Sahni Institute of Palaeosciences, Lucknow, India
e-mail: nivedita_mehrotra23@hotmail.com

N. Basavaiah
Indian Institute of Geomagnetism, Navi Mumbai, India

Introduction

The tropical region of northeastern India has limited number of palynological records for elucidating the palaeo-vegetation and palaeo-climate of the Holocene Epoch (Mehrotra et al. 2014; Achyuthan et al. 2016; Kar and Quamar 2019). Tripura is the southernmost state of northeastern India with the states of Assam and Mizoram towards its east, and sharing the borders