

Multiproxy studies on the spatially distinct surface samples to reconstruct palaeoecology and palaeoclimate from the Core Monsoon Zone of India

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Abstract

Palaeoclimatic reconstructions necessitate an understanding of the various biotic and abiotic responses to develop a modern analogue. The interpretation and calibration of the modern data allow us to check the lead-lag effect in different proxy parameters, which could be applied for robust palaeoclimatic reconstructions. We, in the present study, analysed pollen and diatom (biotic proxies), as well as grain size, magnetic susceptibility and geochemistry (abiotic components) of the modern soil samples, collected from the states of Madhya Pradesh and Chhattisgarh, the Core of the Monsoon Zone (CMZ) in central India. The weathered materials of the Palaeocene Cretaceous extrusive rocks and sedimentary rocks of the Late Triassic to the Upper Carboniferous are underlying the soil cover in these areas, respectively. The study revealed that the overall pollen and diatom preservation is comparatively good in the areas where the Palaeocene Cretaceous extrusive rocks are found except for the areas of human settlements, whereas the preservation of pollen and diatom was comparatively poor in areas where sedimentary rocks of the Late Triassic to Upper Carboniferous are found. The most plausible reason for this difference is the availability of nutrients which are supplied more abundantly by the easily weatherable Deccan basalt rocks compared to their sedimentary counterparts. The present study will serve as baseline information about biotic-abiotic interactions operating in the central Indian Core Monsoon Zone (CMZ). Since the intensity and duration of the rainfall in the CMZ are largely governed by the annual Indian summer monsoon rainfall (AISMR), therefore, the present study could help trace the weak or intense monsoon periods (break and active spells, respectively) of the past hundreds to thousands of years by studying the sediment profiles/cores.

Keywords

Palynology, diatom, grain size, geochemistry, magnetic susceptibility, surface samples, central Indian Core Monsoon Zone

INTRODUCTION

The ecology and its environment comprise an intrinsic network of interactions among various biotic and abiotic

components that are influenced by both internal and external driving factors. At present, most of the natural ecosystem interacts with variable sources in varying capacities and causes unbalanced oddity in nature. A significant transformation

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