

Neloy Khare *Editor*

Changing Climate over India

Past to Present

 Springer

Phytolith-Based Palaeoclimate Studies in the Indian Subcontinent

| Chapter | First Online: 03 September 2026

| pp 217–236 | [Cite this chapter](#)



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Waseem Qader, Malik Zubair Ahmad, Jehangeer Ahmad Mir, Suhail Hussain Sheikh, Sajad Ahmad, Reyaz Ahmad Dar  & Irfan Rashid

Abstract

Tectonic movements and monsoon evolution have driven significant climatic and environmental changes across the Indian subcontinent, reshaping faunal distributions and vegetation patterns over geological time. While the region today hosts diverse vegetation zones, including tropical evergreen, deciduous, thorn forests, and grasslands, paleoclimate proxy data reveal dramatic historical shifts. Vegetation transitioned from mixed systems in the Late Oligocene to temperate types in the Oligo-Miocene, followed by a shift from C3 dominance during the Early-to-Middle Miocene to C4 grasslands during the Late Miocene-Pliocene. Following a major expansion of C4 biomass from the Middle Pliocene to the Middle Pleistocene, modern grasslands stabilized in the Early Pleistocene. The Middle-to-Late Pleistocene was marked by climate-driven C3/C4 oscillations, followed by a steady rise in C4 vegetation. Since then, variations in monsoon rainfall have continued to dictate the proportions of C3 and C4 plant regimes. Because vegetation distribution mirrors regional climate shifts, paleovegetation archives are