



Modern pollen dispersal in relation to present vegetation distribution and land use in the Baspa valley, Kinnaur, western Himalayas

Nidhi Tomar · Ipsita Roy · Shreya Shri · Bency David Chinthala ·
Mayank Shekhar · Amber Srivastava · Parminder Singh Ranhotra ·
Chandra Prakash Singh · Amalava Bhattacharyya

Received: 11 September 2023 / Accepted: 8 January 2024
© The Author(s), under exclusive licence to Springer Nature Switzerland AG 2024

Abstract Interpretation of a fossil pollen data for the vegetation and climate reconstruction of any region needs a modern pollen-vegetation analogue for its calibration. We analyzed the surface sediments and moss polsters for the pollen and microcharcoal records to understand the modern pollen-vegetation relationship and human activities in the Baspa Valley, Kinnaur, Himachal Pradesh. Presently, valley is occupied by the arboreal and non-arboreal vegetation of temperate to subalpine habitats and land use activities. The recovered pollen assemblages showed variability in the dispersal behavior of pollen of taxa growing along the valley transect and also captured the

signals of human activities over land use. The overall dominance of arboreal pollen in the recovered pollen assemblage corresponds with the dominant growth of conifers and broadleaf tree taxa and represents the valley vegetation at a regional scale. However, the profuse pollen production of a few arboreal taxa and long distance pollen transport from one vegetation zone to other by the strong upthemic valley winds could bias the pollen representation of in-situ vegetation. The high pollen frequency of non-arboreal taxa in the open meadows represents the near vicinity to their plant source. Human activities like fire burning and cultivation by the local population are evident by the recovery of microcharcoal particles and pollen of plants belonging to Cerealia Poaceae, Asteraceae, Amaranthaceae, Polygonaceae, Rosaceae, Juglandaceae, etc. The dataset taken as modern

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10661-024-12340-8>.

N. Tomar · M. Shekhar · P. S. Ranhotra · A. Bhattacharyya
Birbal Sahni Institute of Palaeosciences, 53 University
Road, Lucknow, India

N. Tomar · P. S. Ranhotra (✉)
Academy of Scientific and Innovative Research (AcSIR),
Ghaziabad, India
e-mail: parmindersingh_ranhotra@bsip.res.in

I. Roy
Indian Institute of Tropical Meteorology, Dr. Homi Bhabha
Road, Pashan, Pune, India

S. Shri
Rajat P.G. College, University of Lucknow, Lucknow,
India

B. D. Chinthala
Institute of Geography, University of Erlangen-Nürnberg,
91052 Erlangen, Germany

A. Srivastava
Botanical Survey of India, Northern Regional Centre,
Dehradun, India

C. P. Singh
Space Applications Centre, Indian Space Research
Organisation, Ahmedabad, India