



Psammichnites gigas gigas sub-ichnozone and microbially induced sedimentary structures (MISS) from Kunzam La Formation (Cambrian), Hojis Valley, Kinnaur, Himachal Himalaya

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We propose the *Psammichnites gigas gigas* sub-ichnozone in the Cambrian Kunzam La Formation exposed in the Hojis Valley, Kinnaur, Himachal Himalaya, which indicates a Cambrian Series 2–Stage 4 age for the host sediments. Additionally, the paper also reports eight microbially induced sedimentary structures (MISS) represented by distinctive reticulate (‘Elephant skin’ and ‘Kinneyia’ types) and linear patterns with cracked ripple crests, and mat slump structures. These MISS are closely associated with grazing trails of *Psammichnites gigas gigas*. The preservation in alternating well-sorted and thick (3–20 cm) fine sandstone beds and associated sedimentary structures indicate a shallow marine, nearshore-to-shoreface depositional environment. MISS, ripple marks, and bio-stabilized substrate indicate a limited influx of clastics, with photoautotrophic microorganisms likely contributing to their formation.

Keywords. Tethyan Himalaya Zone; Cambrian; trace fossils; microbially induced sedimentary structures (MISS); Kinnaur; Kunzam La.

1. Introduction

The Himalayan Cambrian data has garnered global attention in recent decades due to additions of new horizons and fossils, enabling a refined biostratigraphy and establishment of various trilobite biozones, levels, and ichnofossil zones (Jell and Hughes 1997; Hughes *et al.* 2005; Peng *et al.* 2009; Singh *et al.* 2016, 2017a, b, 2023; Singh and Bhargava 2020; Kaur *et al.* 2021; Verma *et al.* 2023; Negi *et al.* 2023). The study was primarily confined

to the Zaskar and Spiti regions of the Tethyan Himalaya (TH), with limited coverage in the Lesser Himalaya (LH). There exist two main stratigraphic intervals in the TH region (Singh and Bhargava 2020) covering ~514–505 and 505–498 Ma in Spiti–Zaskar and partially in Kashmir, and four stratigraphic intervals in the LH region, spanning ~542–535, 524–513, around 516 Ma, and ~512 Ma intervals. The Kinnaur and the Kumaun–Garhwal regions in TH are relatively understudied and lack detailed Cambrian