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## **Need to relook at the depositional environment of the Himalayan Foreland Basin during transition from the last marine to first continental sedimentation**

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The collision and suturing of Indian plate about 50 Ma ago resulted in closure of Tethyan Ocean basin, commencement of Himalayan Orogen and subsequent formation of foreland basin towards south. This last phase of marine sedimentation in India during Paleocene-Eocene is represented by deposition of Subathu Formation which unconformably rest on the Lesser Himalayan sedimentary rocks and are overlain by the continental sediments of the Dagshai Formation. The contact between Subathu and Dagshai Formations remains controversial and is marked by a combination of variegated purple siltstone-shale alternations, described as 'passage beds' [1, 2] which in turn, are overlain by dull white sandstone. Further, this transition between Subathu and Dagshai Formations, both in terms of depositional environment and age, is poorly understood. Surprisingly, these passage beds show evidence for pedogenesis but no such palaeopedological studies have been reported so far. It is indeed intriguing why pedogenesis of these sediments has not been taken in to consideration while reconstructing depositional environment and set-up of the basin.

A number of outcrops of passage beds occur in and around Shimla hills of Subathu sub-basin of the Himalayan Foreland Basin. An extensive field work in one of such beautifully exposed outcrops near Parwanoo district of Himachal Pradesh state of India was carried out. The passage beds are pedogenically modified, some fossiliferous but show conspicuous changes in colour from greenish-grey to dark grayish-brown to dark reddish-brown up-sequence. Pedons vary in thickness from a few to tens of centimeters. Structure largely comprises sub-angular to sub-rounded blocky peds. Though horizonation is not very prominent but a suite of pedogenic features include burrows, root traces, infillings, mottling, cutans/illuvial coatings, segregations, nodules and concretions with their dominance varying significantly within passage beds from the greenish-grey lower/older pedons to the reddish-brown upper/younger pedons. For example, biogenic features, like root traces are common and largely filled with calcareous material in the reddish-brown upper pedons whereas mottling is prominent in the greenish-grey lower pedons. Likewise, greenish-grey pedons are dominated by Fe-Mn oxide segregations and nodules whereas the reddish-brown pedons are dominated by presence of carbonate segregations with some nodules as well as by cutans.

Therefore, it seems that the passage beds have undergone some degree of pedogenesis and detailed laboratory investigations will be interesting to reveal the nature and extent of pedogenesis so as to decipher depositional environment. Also, this work provides a good opportunity for such detailed studies all along the Himalayan Foreland Basin in order to reassess the stratigraphic position, nature and chronology besides the sedimentary environment of these passage beds deposited during the transitional phase of marine to continental sedimentation of Himalayan Orogen.

*References:*

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- [2] Bhatia SB (2000) Himalayan Geology 21: 87-97.

