**Abstract**

In the NW Himalaya, Late Quaternary sedimentary deposits along glacial fed Yamuna River  
offers an opportunity to understand the feedback mechanism of Glacial-Interglacial cycles to  
ISM dynamics and resultant fluvial development since MIS-5a (Interglacial). Fluvial terraces and  
alluvial fans contributes to major landforms along River valley from Higher Himalaya (source  
area) to Sub-Himalayan and comprises of ~10m upto ~180m thick gravel deposit carved into  
distinct terrace levels (T-1 to T-7; order of increasing height from modern Yamuna R.). In the  
present work, the geomorphological and sedimentological studies and OSL based absolute  
chronology of these deposits constraints multiple phases (Phase-I to IV) of sediment dispersal  
and accretion in the pre-existing valley punctuated by shorter incision periods. In the narrow  
upper reaches of the valley (near present glacier) and in the middle reach (Lakhamandal area),  
oldest fluvial aggradation (Phase-I) recorded during &gt;83ka to ~80ka (MIS-5a) represented by  
distinct patches of fluvial deposits (T-7). This older aggradation indicative of limited glacial  
advance and fluvial (meltwater) sediment transport and deposition of gravel facies followed by  
incision. Phase-II aggradation continued around ~50ka to ~41ka coincides with MIS-3 (Inter-  
glacial stage) warm and humid climatic condition and preserved as remnant patch of fluvial  
deposits (T-6) followed by rapid incision owing to lower sediment: water ratio. During ~37ka  
upto ~23ka, major sediment accretion phase (Phase-III) is recorded in the wider parts of valley  
(between MBT and MCT) in the form of ~120m thick clast supported fluvial gravel. This phase  
coincides with transitional MIS-3 &amp; MIS-2 (Interglacial-Glacial transition). The sedimentary  
facies, accretion geometry suggests deposition under braided river environment. Glacier retreat  
and release of sediment might have responsible for such extensive aggradation under more  
sediment water ratio and less sediment transporting capacity of Yamuna River. The aggradation  
phase is carved into distinct degradational terrace levels (T-3 to T-5). Another younger  
aggradation phase (Phase-IV) represented by discontinuous terrace deposits (T-1 and T-2) is  
recorded across MCT. The Late Quaternary sedimentary archives in the valley across MCT and  
correlation of aggradation and incision phases are well correlates with Indian Summer  
Monsoon (ISM) dynamics (δ 18 O record), and profound control of glacial-interglacial cycles since  
MIS-5a.