



## **Equilibrium line calculations and pedological investigations as glacio-chronological tools - a case study for the Kali Gandaki (Nepal Himalaya)**

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New investigations on the chronology of deglaciation since the last high glacial period (OIS 2-4) were carried out in subcatchments along the antecedent Kali Gandaki valley. To reconstruct former equilibrium line altitude (ELA) depressions within the very steep and dynamic landforms, TSAM methods are most adequate. The method according to KUHLE (1988) is proved to provide the most suitable results, because of its topographical factor of ELA deviation. Only the extreme topographical changeover arising from the inflow of the former glaciers from the tributary valleys into the wide and flat valley bottom of the Kali Gandaki, as well as the incalculable influence of a temporarily ice inflow from Tibet lead to little uncertainty. However, the *relative* chronology of the glacier stages can certainly be derived. Pedological relative dating methods are based on the formation of pedogenic iron oxides, variances in total element contents and the shift to lower particle sizes during weathering. Only close to the central mountain range crossing section of the Kali Gandaki, where comparable soil development conditions can be found, most of the pedochemical weathering indices mirror the relative chronology of deglaciation correctly. On the other hand most of the granulometric weathering indices are inapplicable because of the typically high textural variability within till deposits. North of the Himalaya main range, only a few very certain pedogenic relative dating methods are applicable as a consequence of the drier climatic conditions. South of the Himalaya main range pedological relative dating is completely prevented by growing human influence, strong morphodynamic processes and highly variable geological conditions and precipitation amounts.

References:

Kuhle, M. (1988): GeoJournal 17: 545-568.