Late-Quaternary sediment fluxes in the Himalayan foreland using geochemical budgeting

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Motivation and Introduction:

Quantifying sediment fluxes of Himalaya through space and time is important to understand its growth and decay. The total flux can be expressed as, $F_{total}=F_{Bedload}+F_{sus.\ load}+F_{diss.\ Load}$ where, F= Flux , and as a function of major oxides, $F_{Total}(X)_{total}= F_{Bedload}(X)_{Bedload}+ F_{sus.\ load}(X)_{sus.\ load}$ where, X= Al_2O_3,Fe_2O_3, SiO_2 [1]. For estimating paleo-fluxes from sediment archive, the silica concentration of the dissolve load or individual flux values can not be estimated directly. In order to account for the missing data, the following adjustments are needed, (i) Amount of dissolved silica in water varies very negligibly from the pH range of 1-8.5. So, we rely on the modern value of dissolve silica;(ii) From the layers of the similar time range, coarser and finer sediment units can be treated as bedload and suspended load respectively; and (iii) To obtain individual flux values, first a total particulate load value of that time can be calculated with the help of net depositional or erosional rate. Using this and flux ratios, individual fluxes can be estimated. To test this hypothesis, major oxide data from each litho unit of two alluvial cores from the Kosi Megafan in the Himalayan foreland, ~45 m deep and 50 ka old, have been used.

Result and discussion:

Fig1: Change in Suspended flux value of paleo Kosi flow.

Figure 1 shows a similar trend of suspended fluxes for both cores (KS1 and KS2) where the average flux values of MIS 1 is 3.3 and 2.3 times higher compared to MIS2 and MIS3 respectively. An increased sediment flux during intensified monsoon periods of MIS1 has also been documented from the Himalayan source region [2] as well as Bengal delta region [3]. Our geochemical approach supports the earlier findings

[1] Galy, A. and France-Lanord, C. (2001), *Geology 29(1),* 23-26. [2] Bookhagen et al. (2005), *Geology 33.2,* 149-152. [3] Goodbred, Kuehl (2000), *Sedimentary Geology133.3-4*, 227