

Holocene megaflood history and provenance of the upper Indus- River.

Implication for human migration along the ancient Silk Road at Ladakh

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KEY ISSUES

- Paleoflood record and provenance of Upper Indus river
- Signatures of human migration within the flood deposits
- Recurrences interval analysis of past floods



Introduction

- Large floods in Himalayan Rivers severely damage human lives and property
- Past hotspots of erosion and origin of floods are crucial in understanding the dynamics of extreme hydrological events
- Himalayan Rivers in context of floods are poorly understood in time and space



Methodology

-Slack water deposits sampled at the banks of Indus and Zaskar River

-Dated using OSL and ^{14}C technique

-U-Pb dating of detrital zircon for provenance

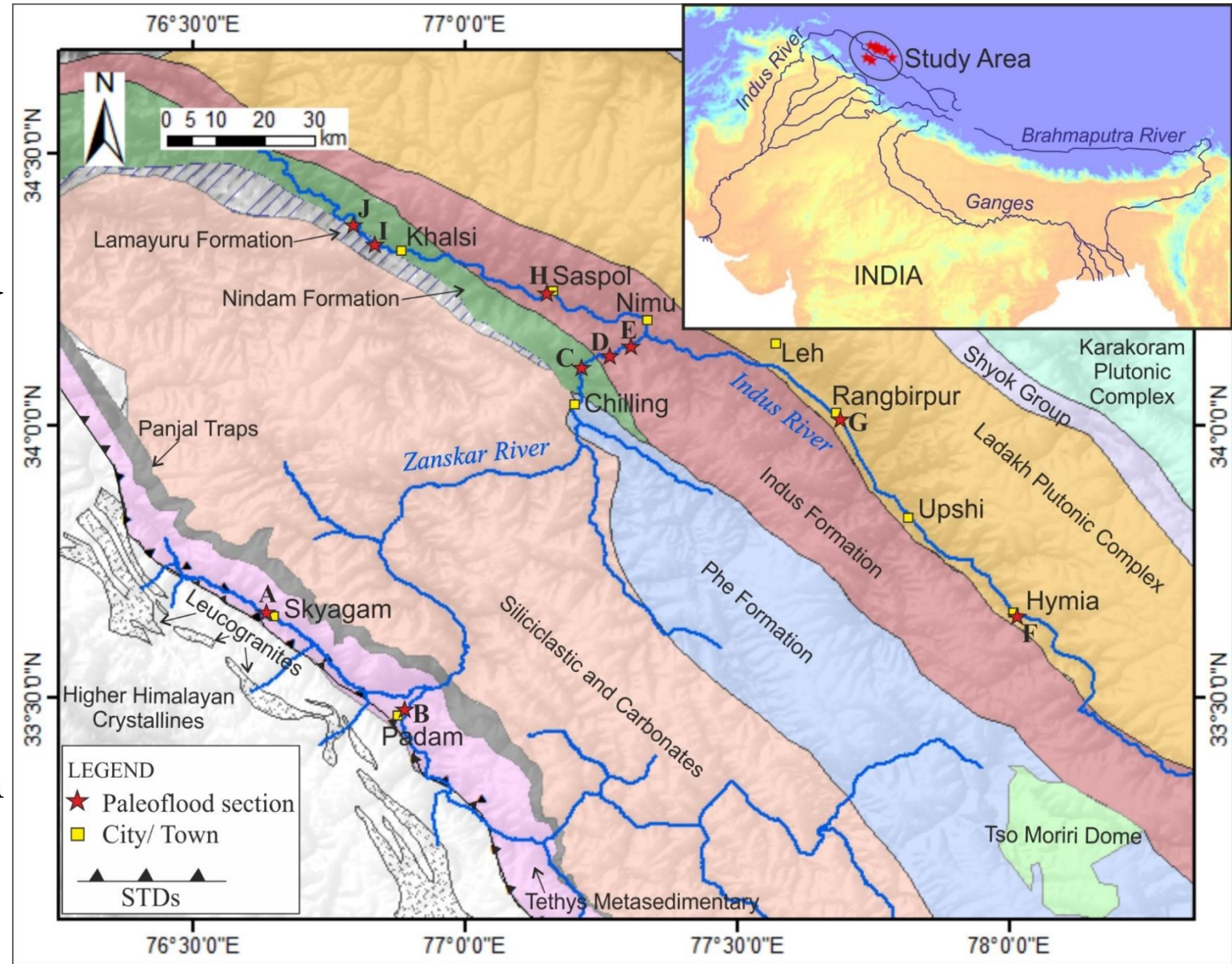


Fig: Geological map of the study area and sampling locations



Slack water deposits (SWDs)

- Fine sediments deposited from suspension due to sudden decrease in velocity
- Sand silt couplets
- Found in tributary margins, rock shelters and incised valleys

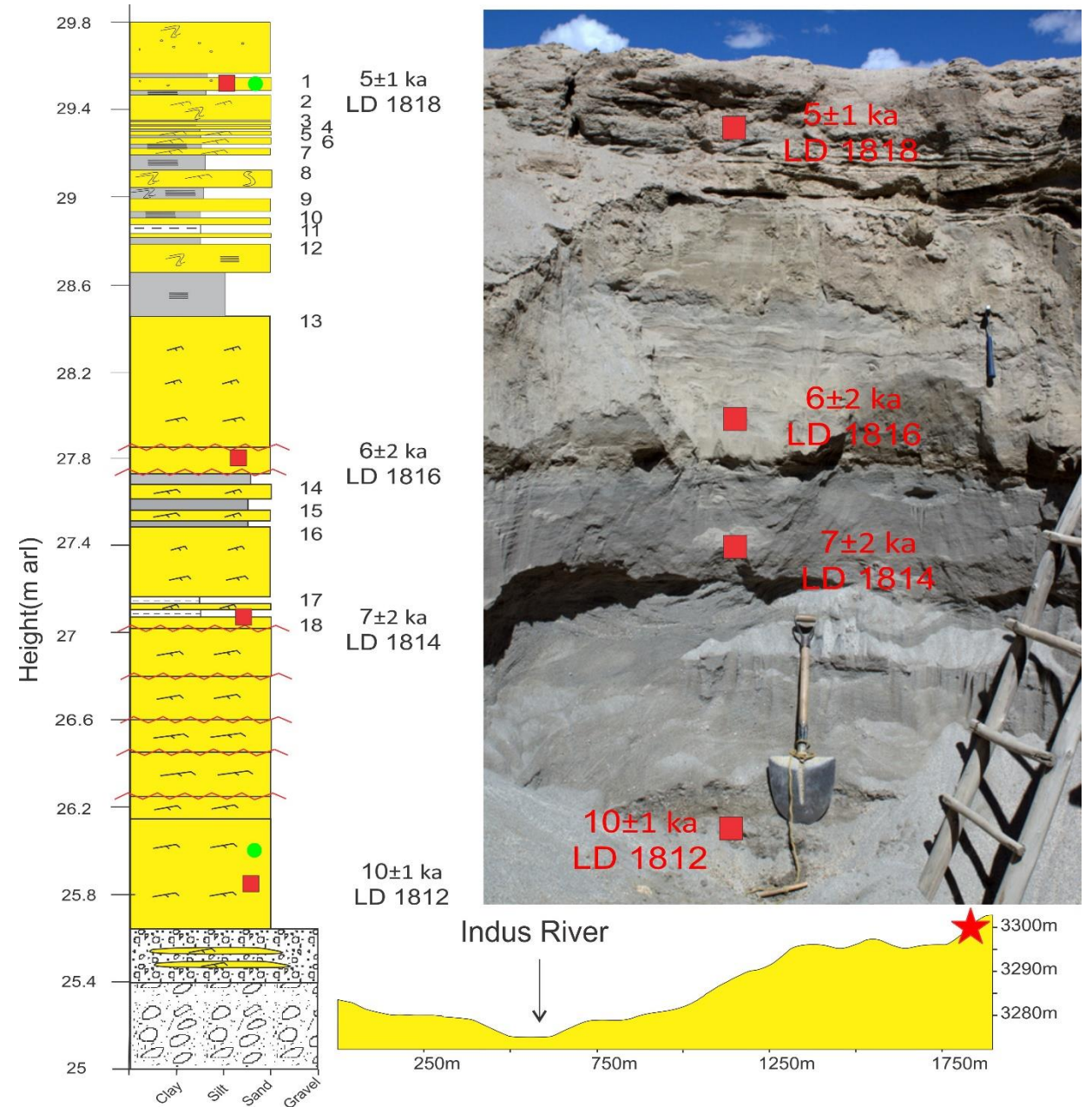


Fig: SWD at Rangbirpur, litholog and valley cross section



Hearth

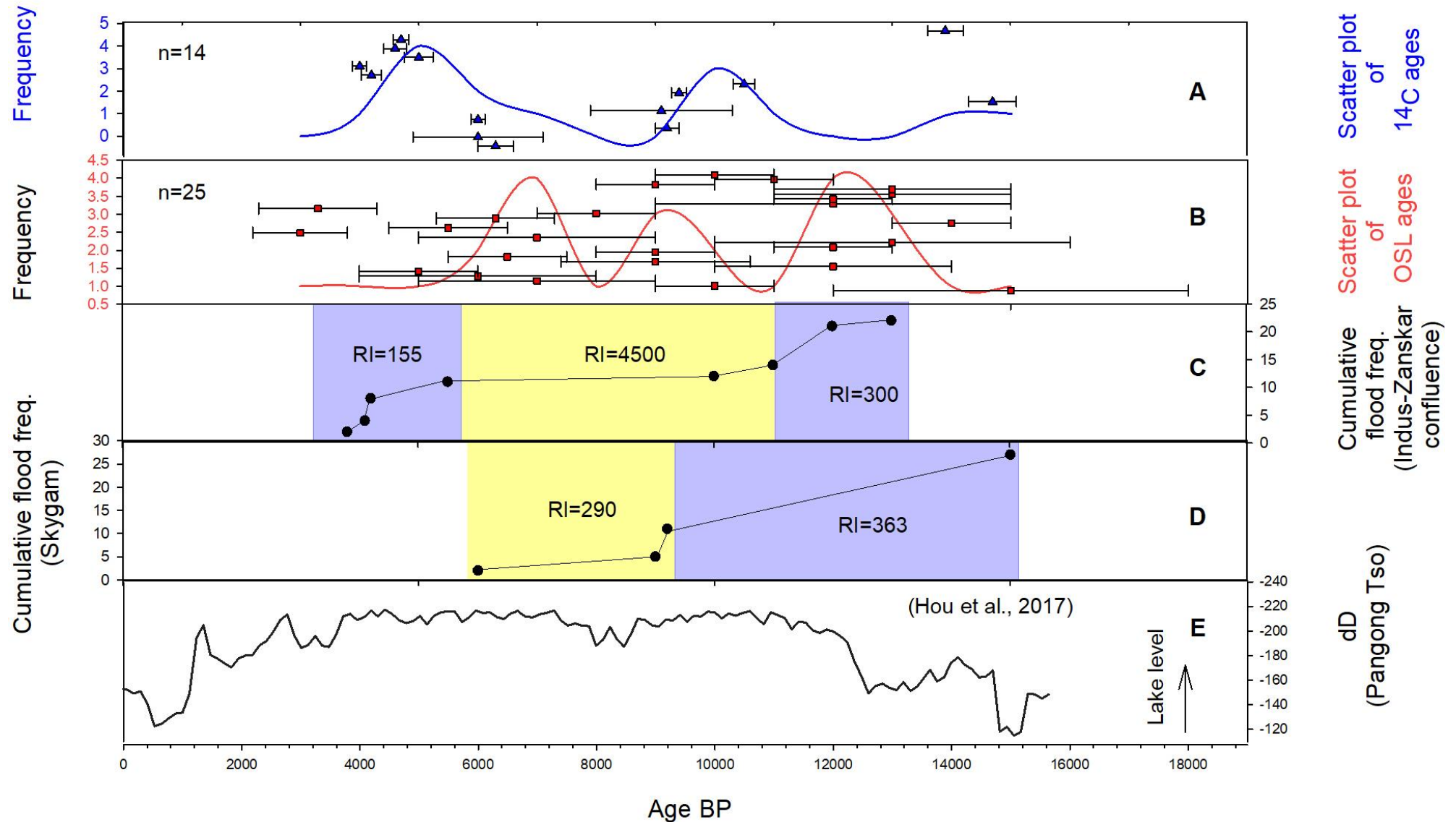
- Burnt layers composed of charcoal, ash, stone tools, woods, bones and dung cakes
- Found embedded within the SWDs
- Relics of anthropogenic activities



Fig: Hearth found within SWD at Hymia



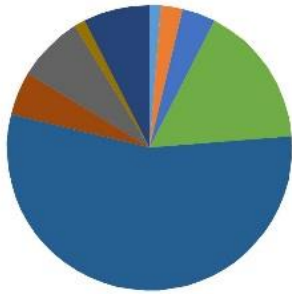
Results and discussion – flood history



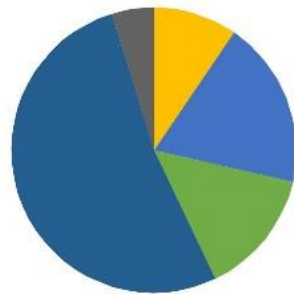
Results and discussion – provenance

Zanskar

Padum
n=79

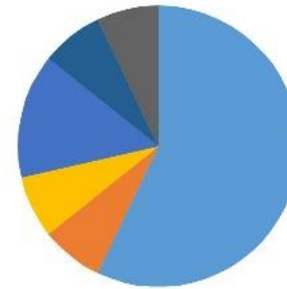


Zanskar confluence
n=23

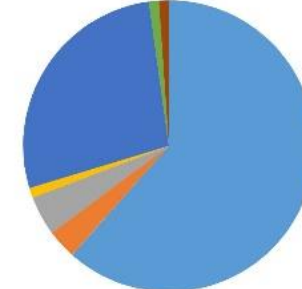


Indus upper

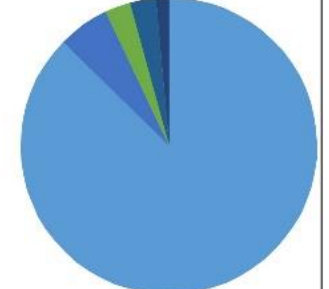
Hymia
n=15



Rangbirpur 1
n=89

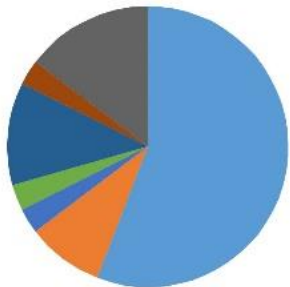


Rangbirpur2
n=72

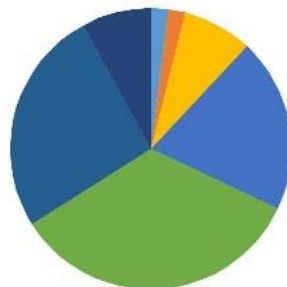


Indus lower

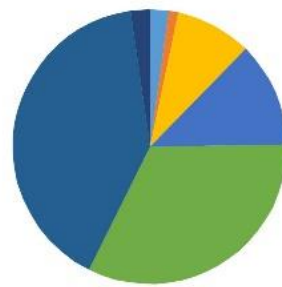
Saspol
n=35



Khalsi 1
n=51



Khalsi 2
n=90



Class(Ma)



Conclusion

- Higher occurrence of mega floods during pronounced northward penetration of Indian Summer Monsoon
- Spatial variation in forcing mechanism between the trunk and the main tributary channel
- More efficient sediment transportation along Zaskar River with higher flood recurrence
- Migration and cultural connectivity between the Indian sub-continent and the Central Asia possibly along the ancient Silk Road at Ladakh as old as ~14ka

