Subsidence control on river morphology and grain size in the Ganga Plain

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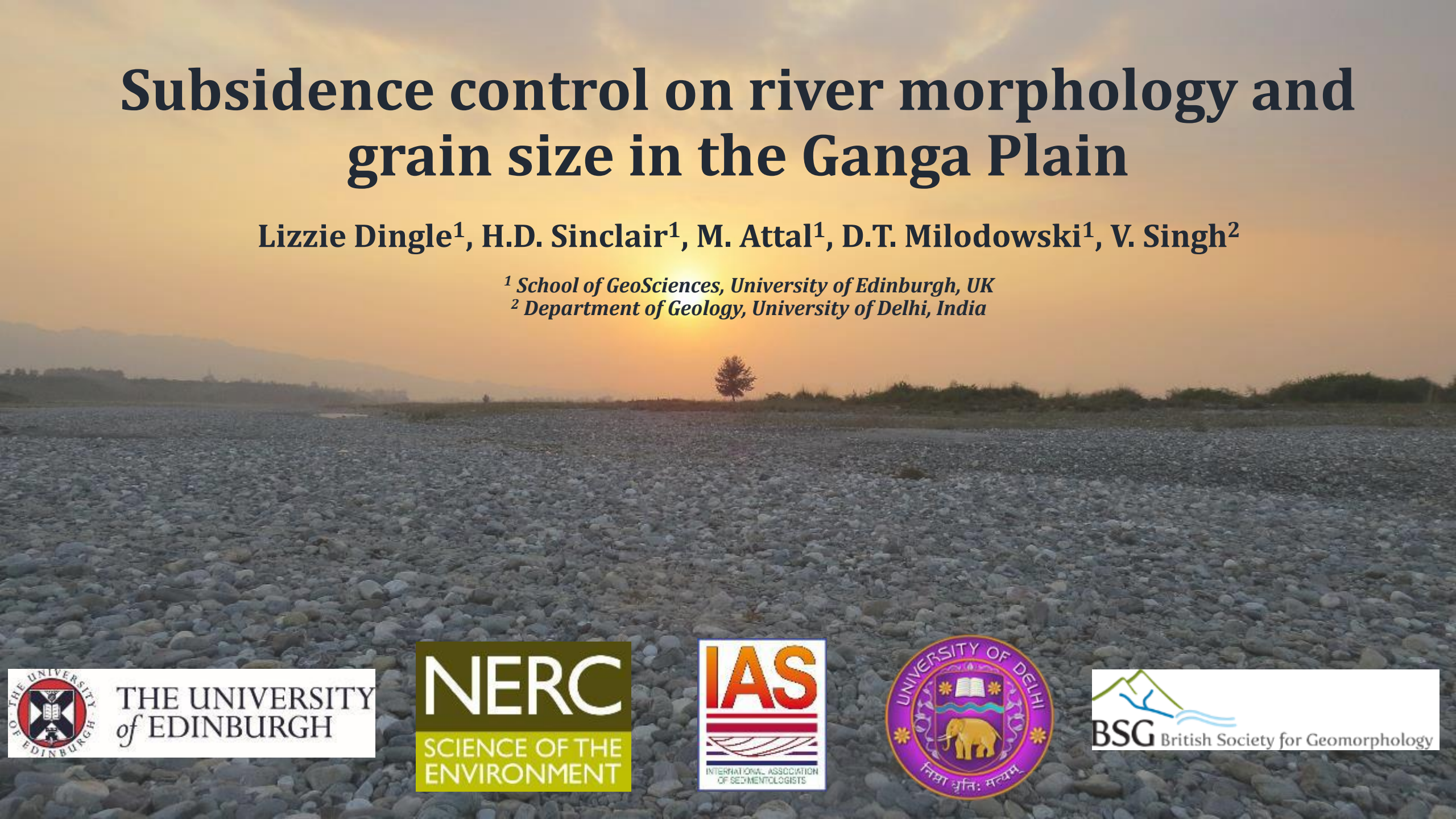
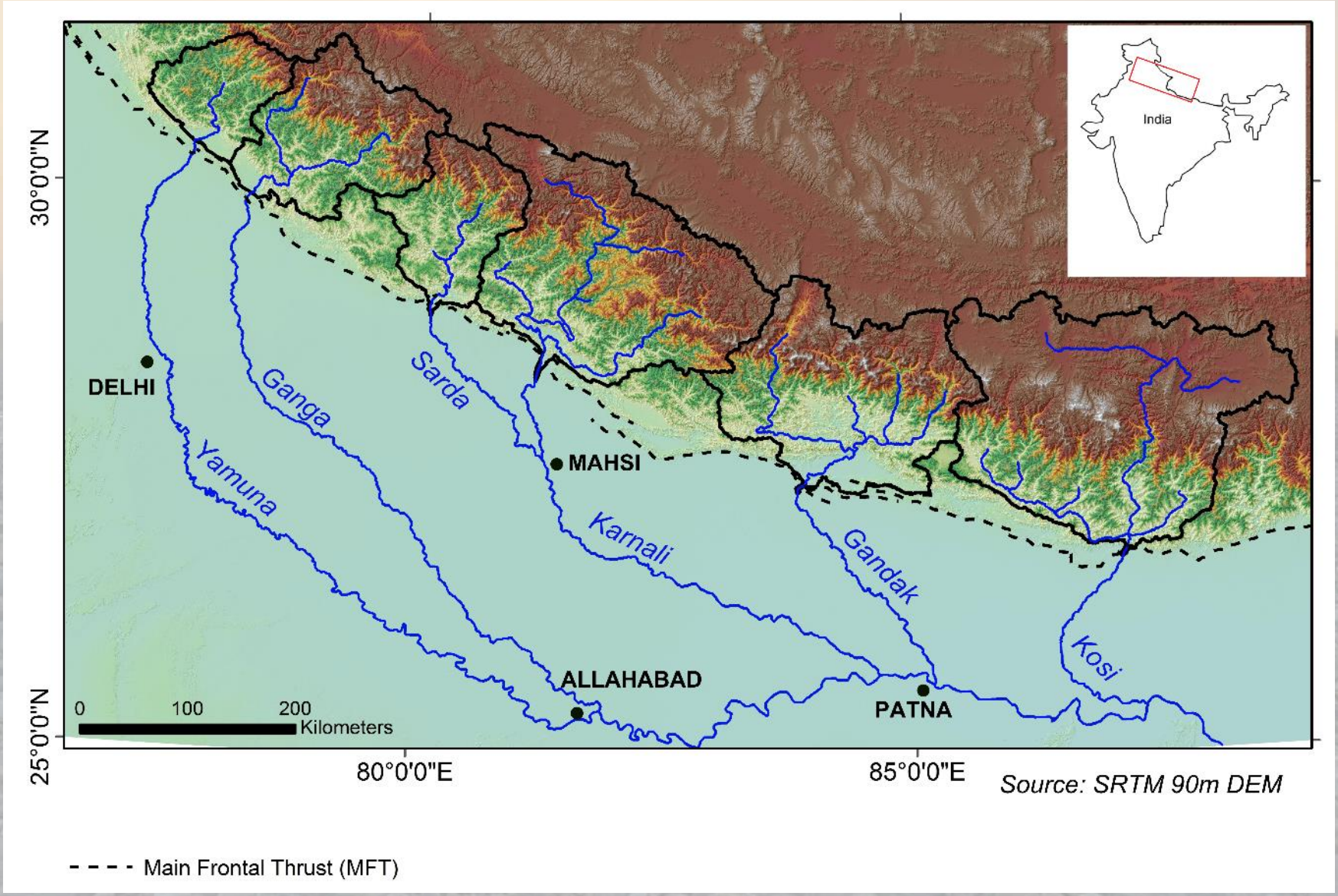
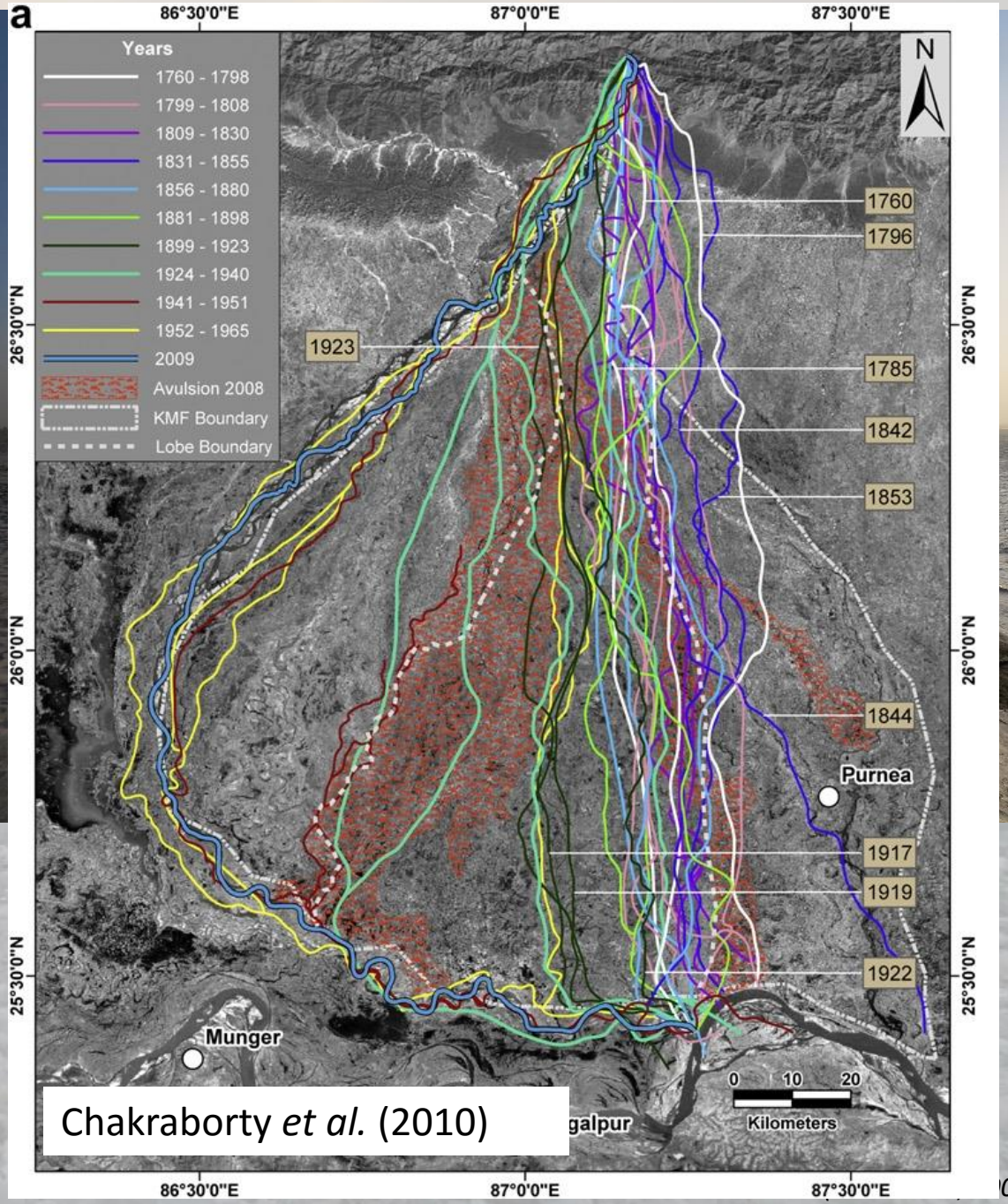


Ganga Plain

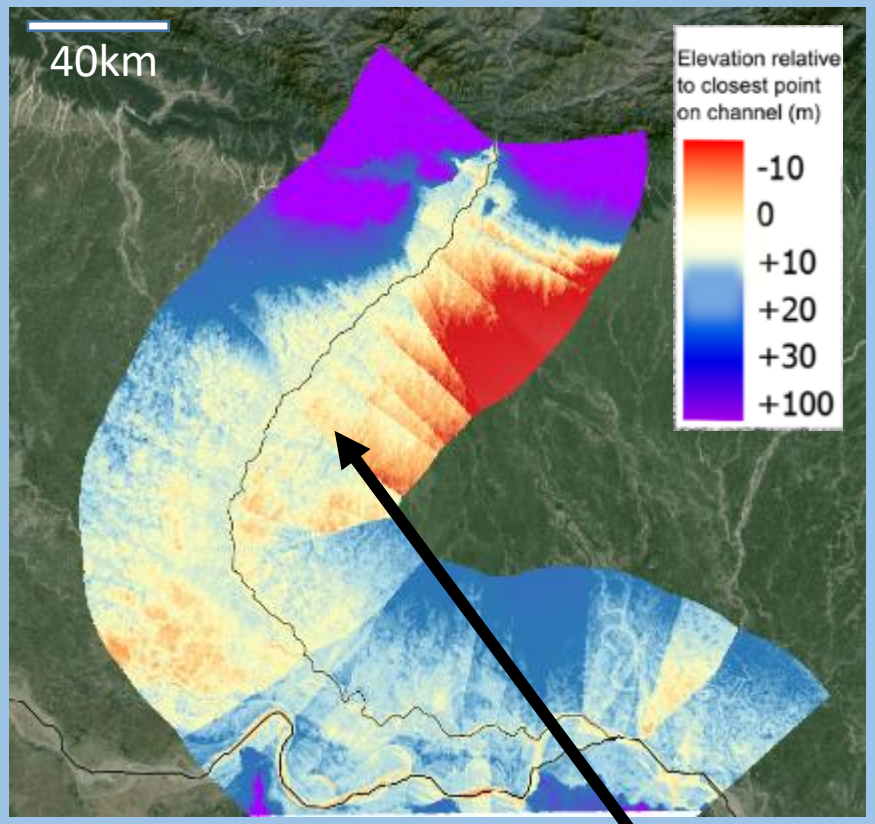

India
DELHI
MAHSI
ALLAHABAD
PATNA
Ganga
Sarda
Yamuna
Karnali
Gandak
Kosi
0
100
200
Kilometers
30°0'0"N
25°0'0"N
80°0'0"E
85°0'0"E
Source: SRTM 90m DEM
Main Frontal Thrust (MFT)

West Ganga Plain

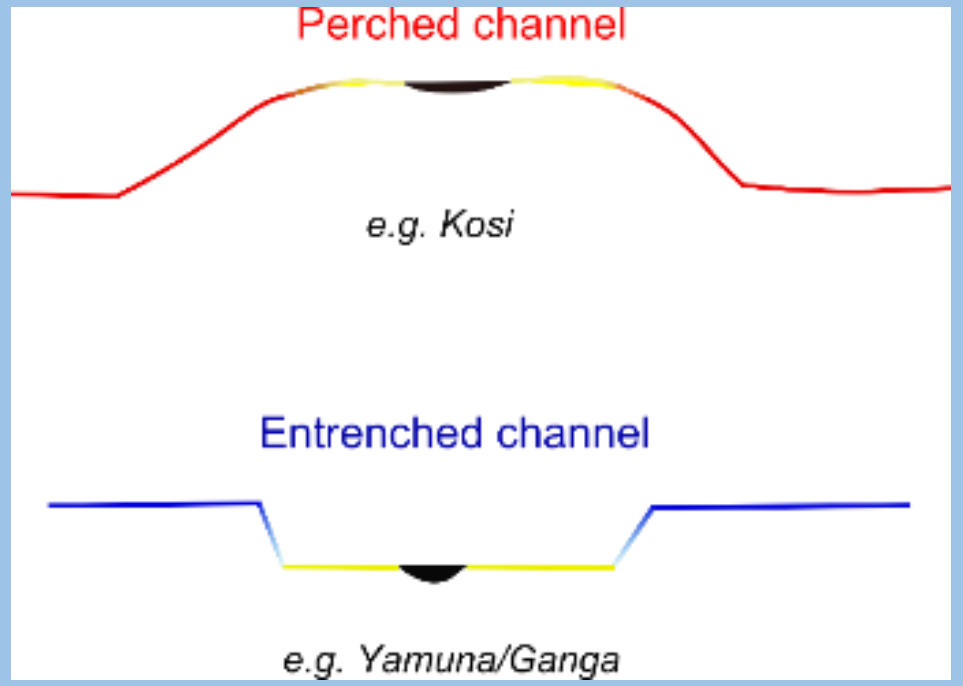
- Degrading
- Stable, incised channels
- Low floodplain sedimentation rates



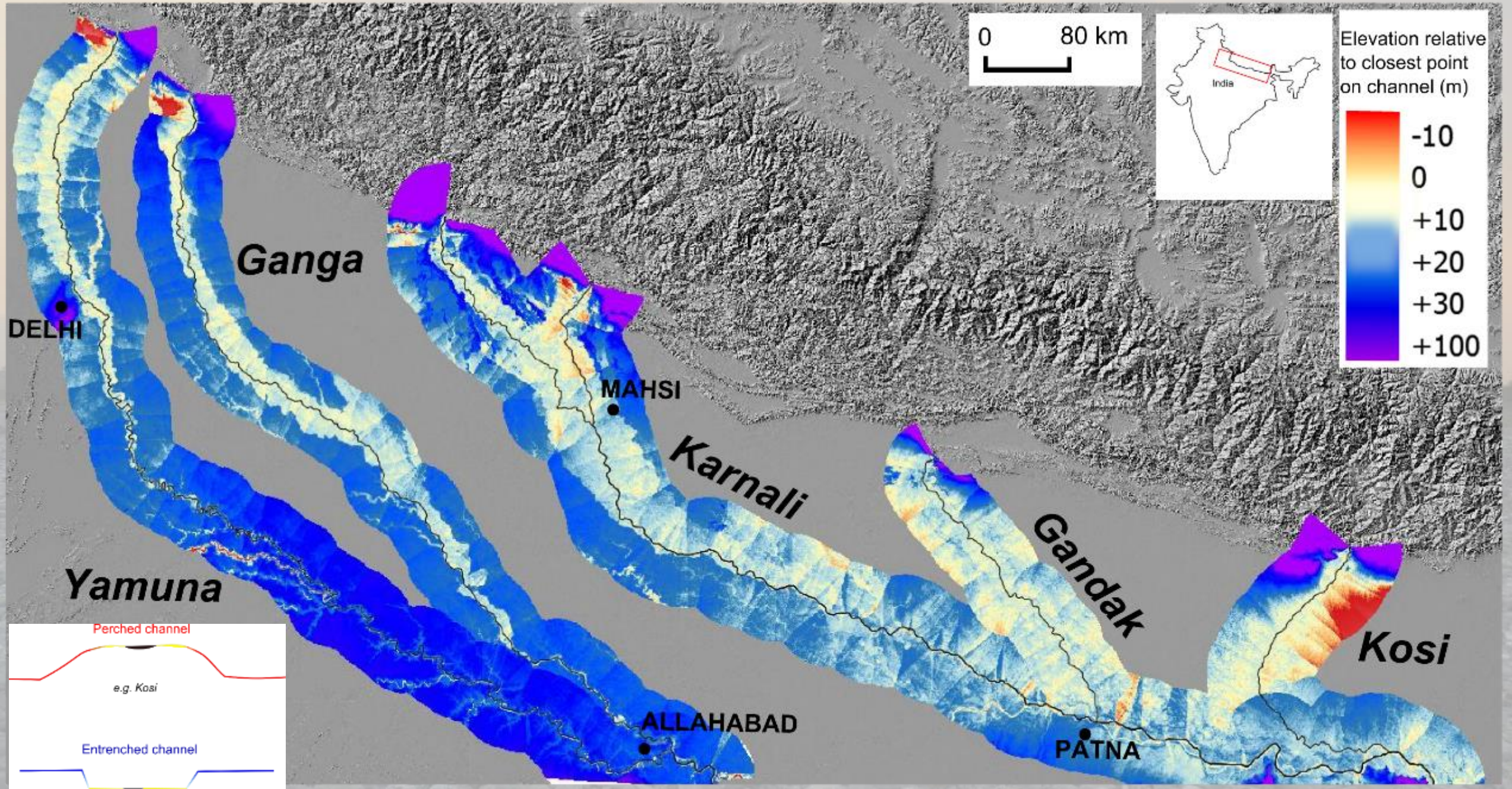
Swath profile - method



Each pixel within the swath is assigned a distance (to the closest point on the channel).

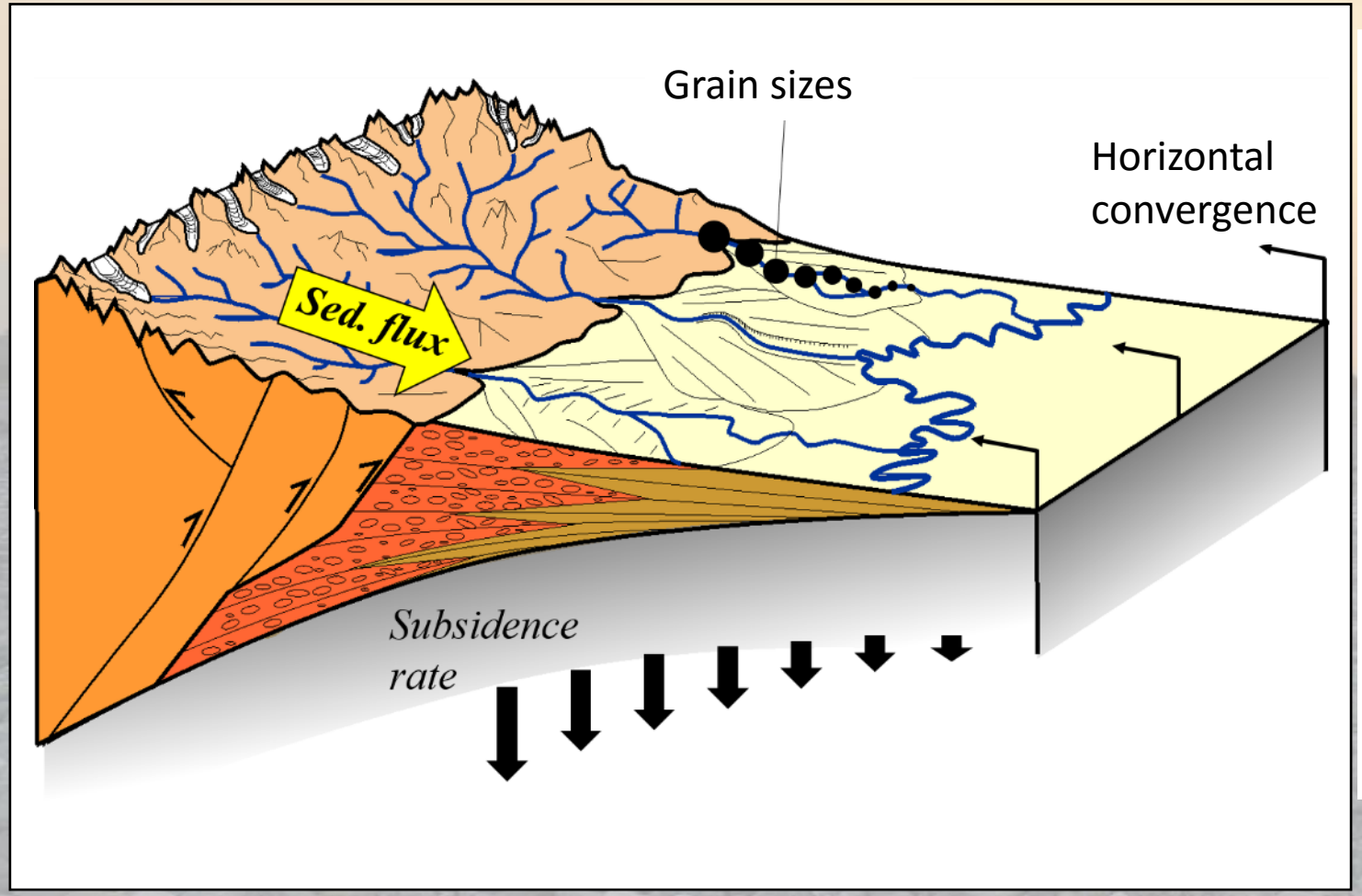


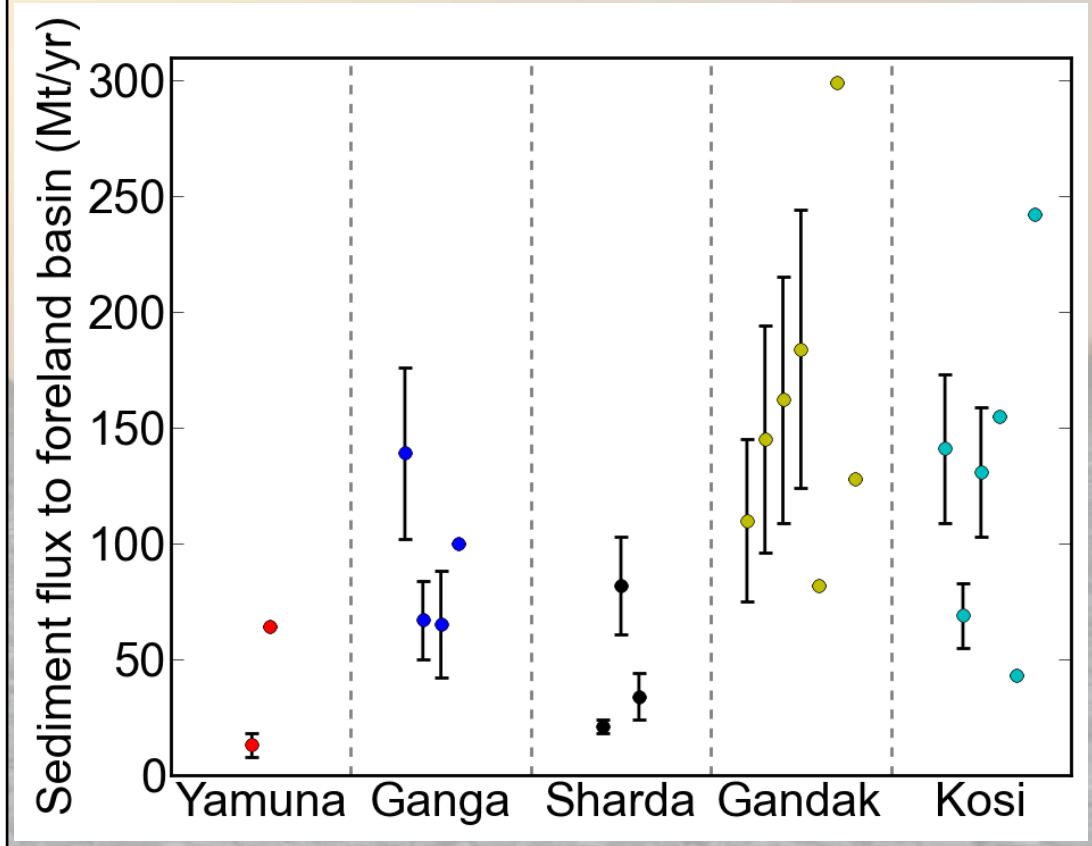
Each pixel is then colour-coded based on its elevation relative to that closest point on the channel



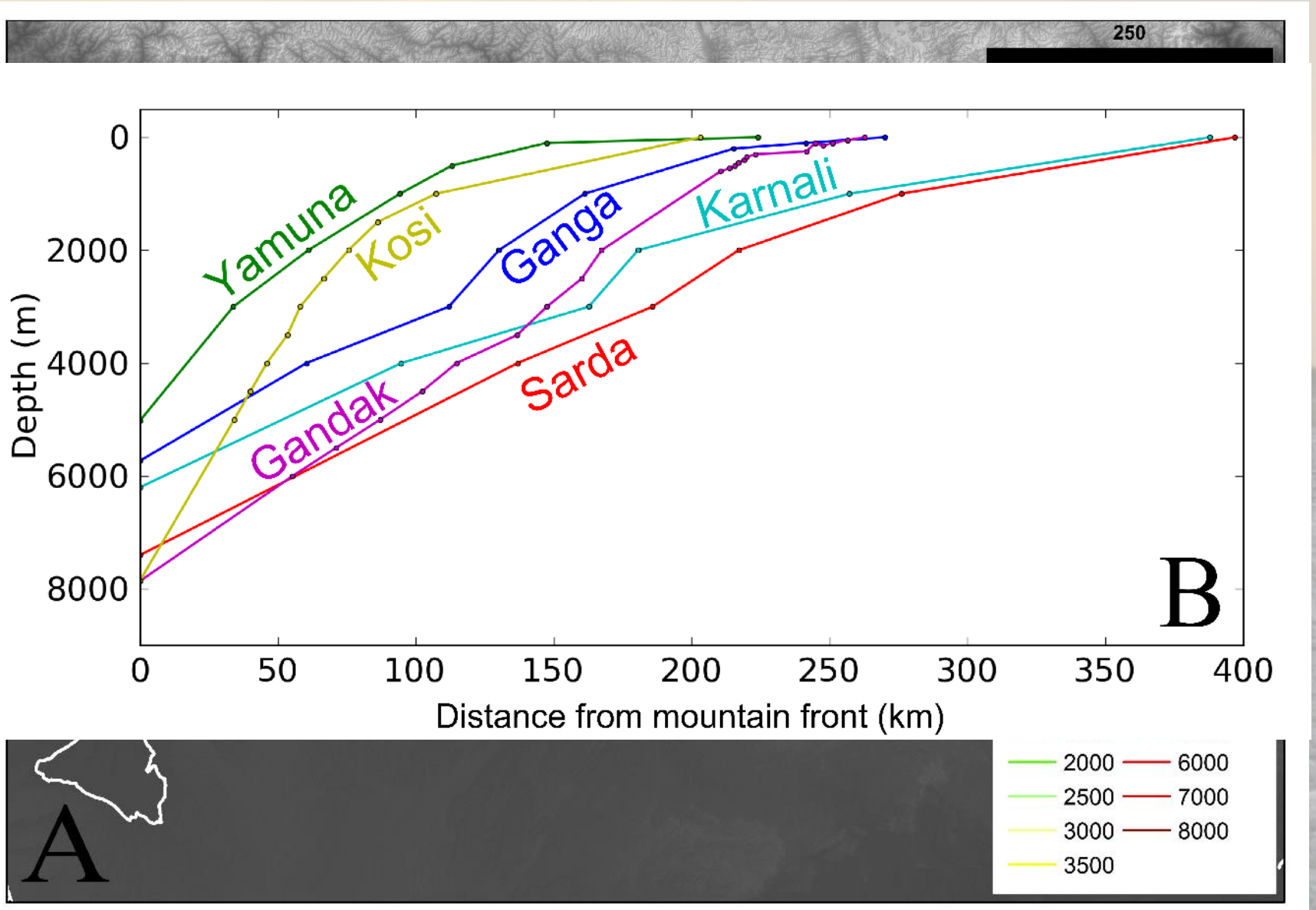
Source: SRTM 90m DEM

Fluvial morphology - controls



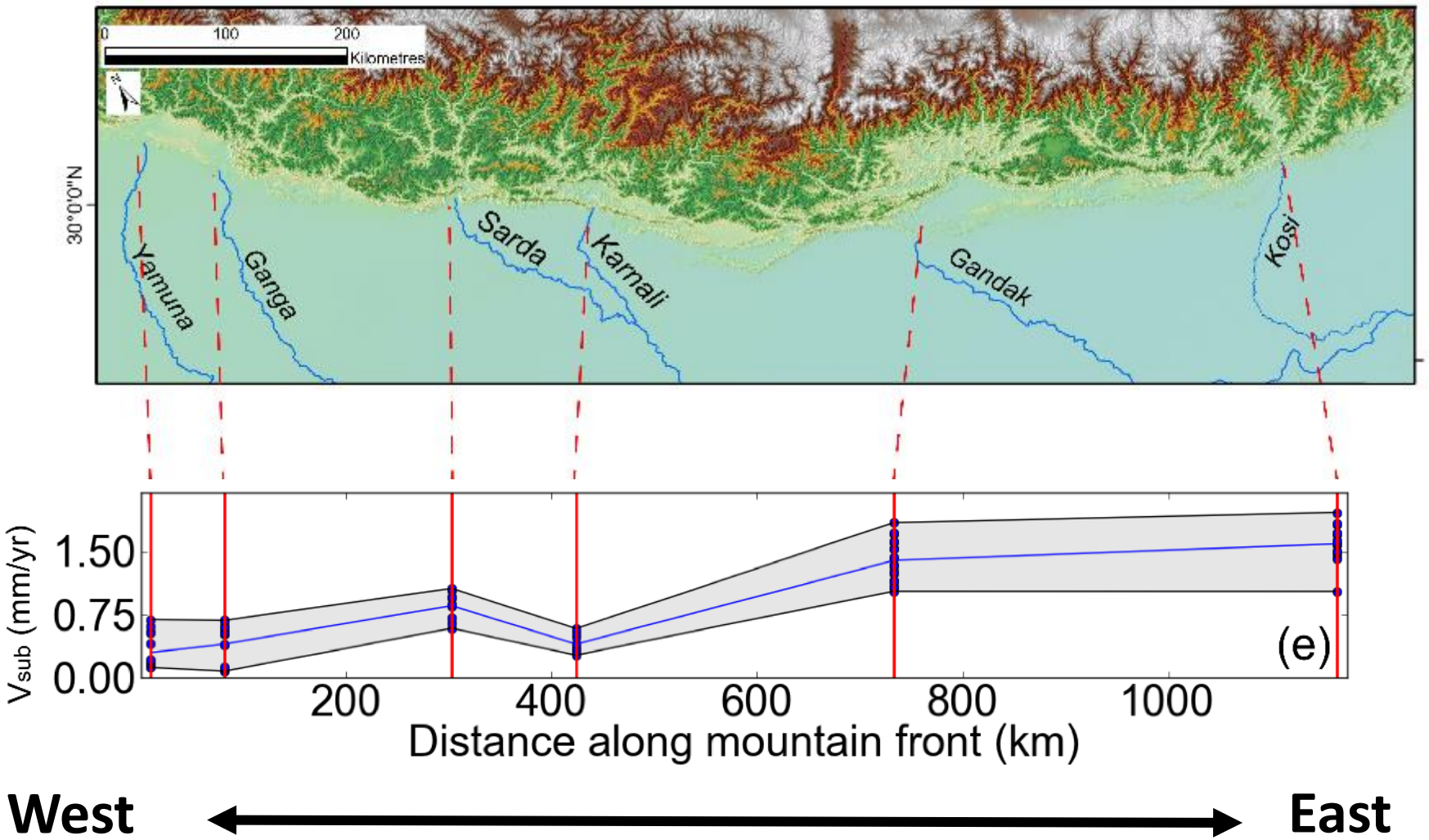


Depth to basement

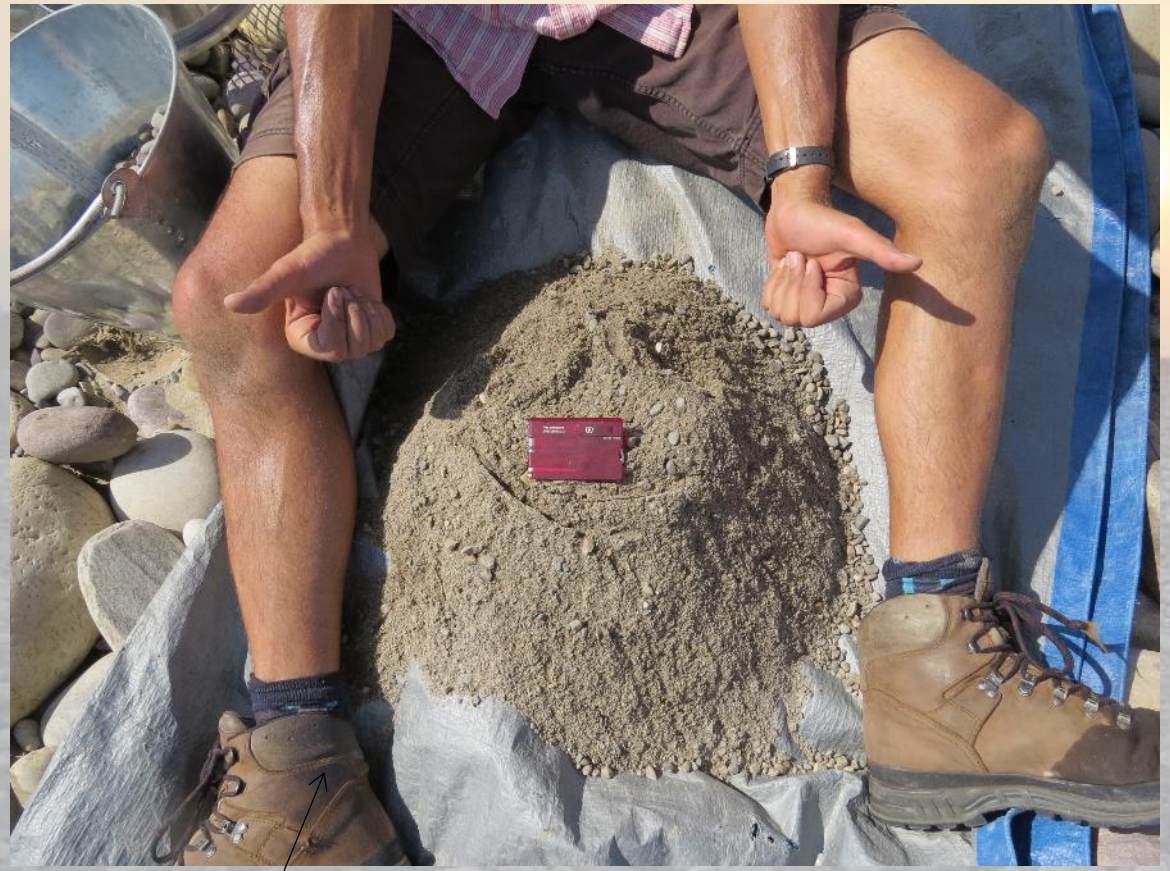


Sources: SRTM 90m DEM & Seismotectonic atlas of India (Geological Survey of India)

Subsidence velocity (V_{sub})

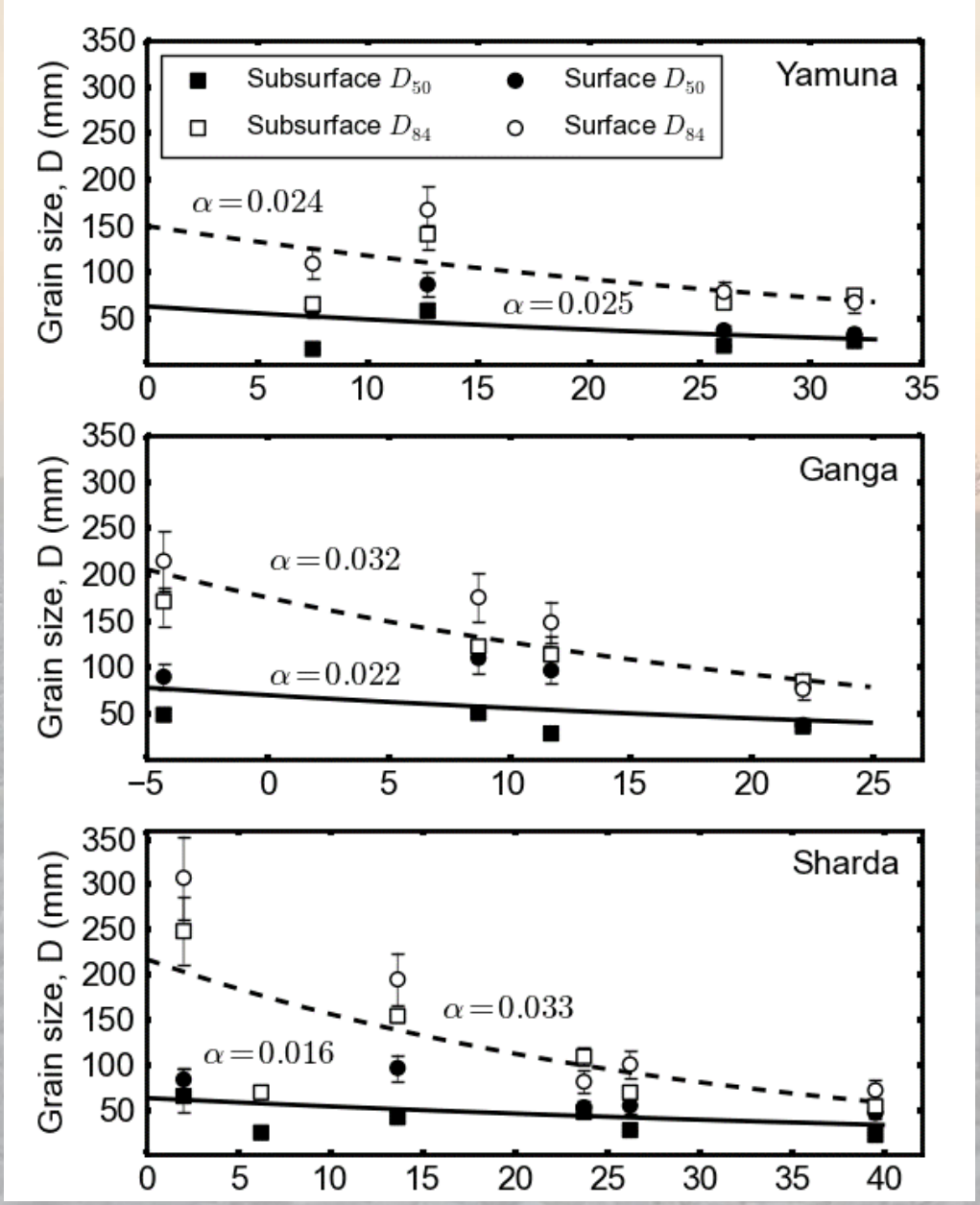


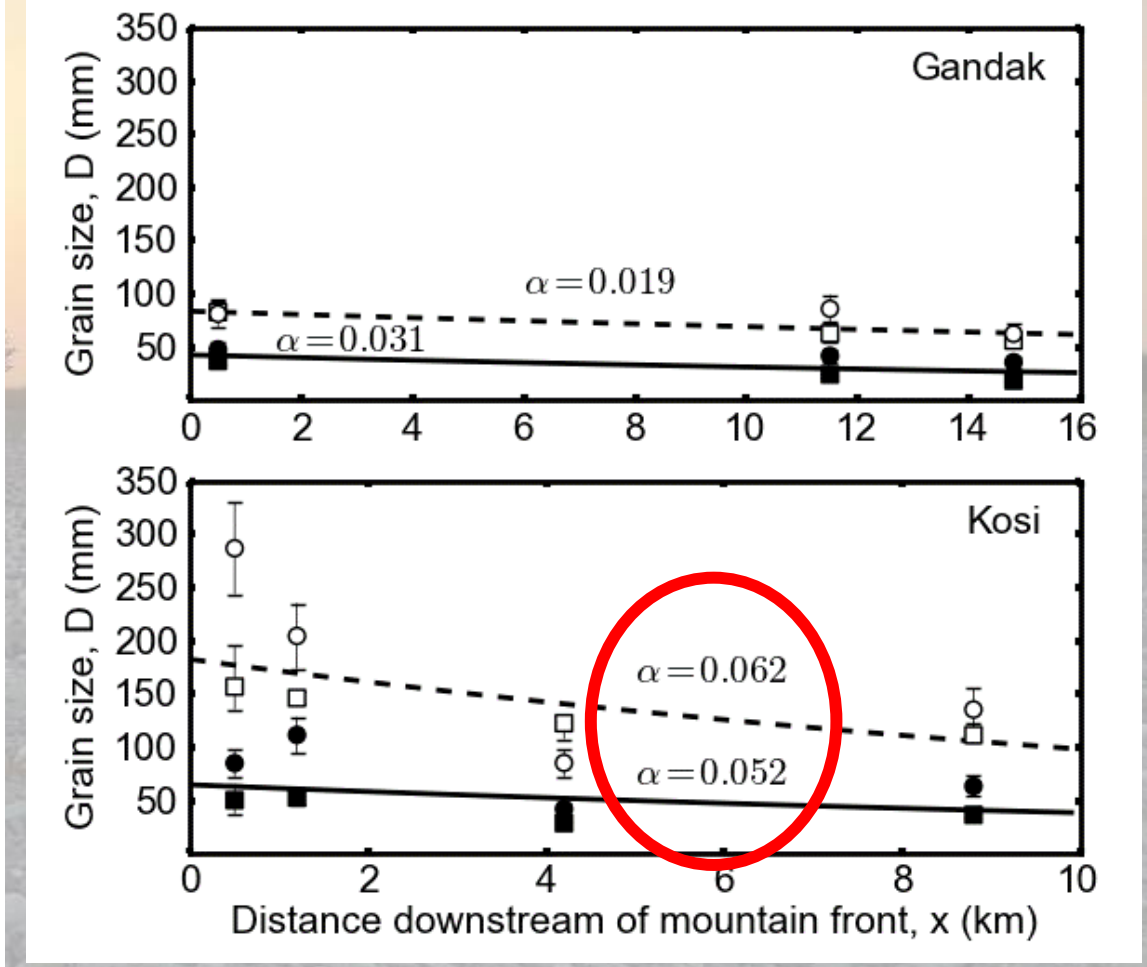
Grain size and fining rates



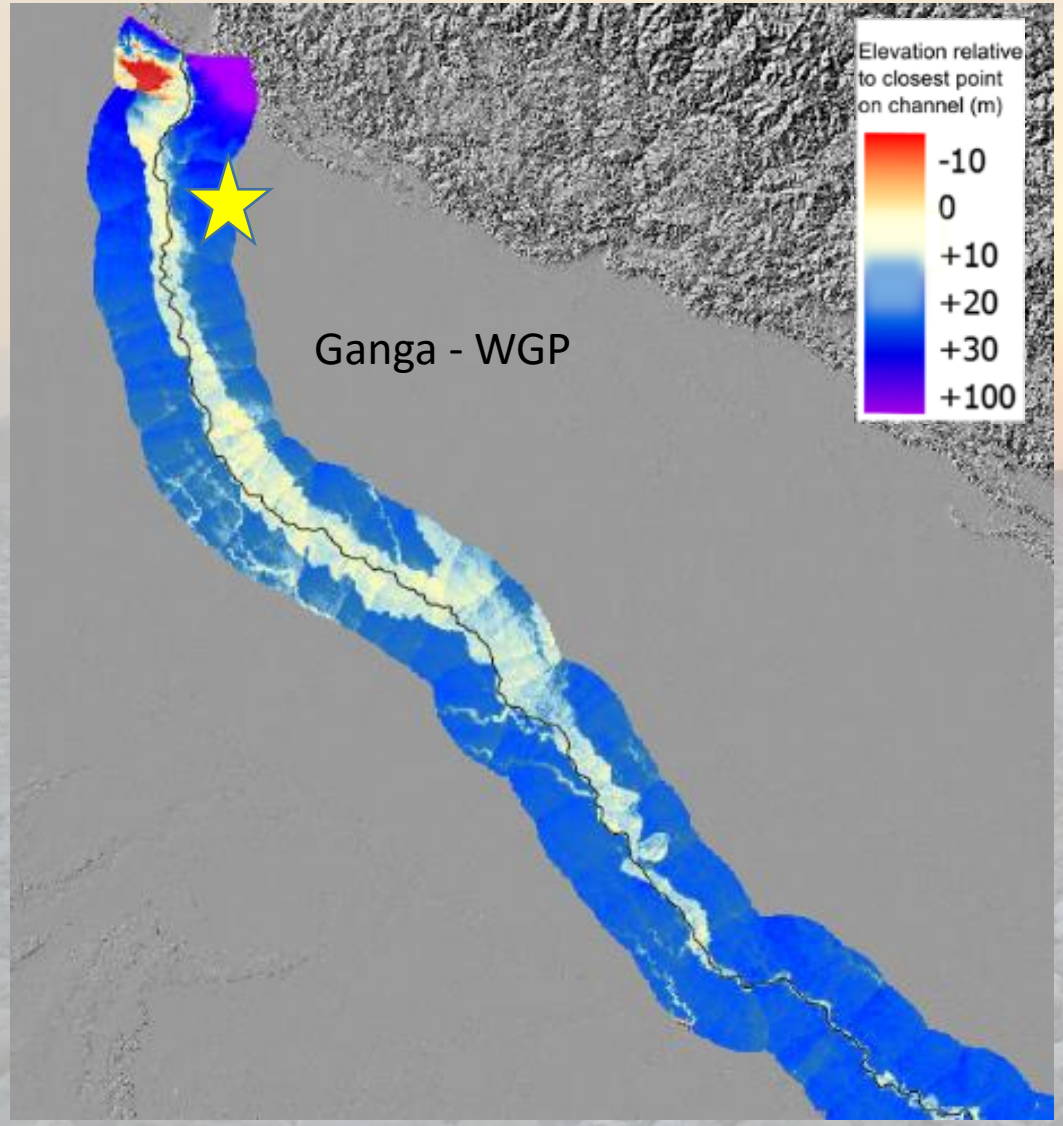
(Not my legs)

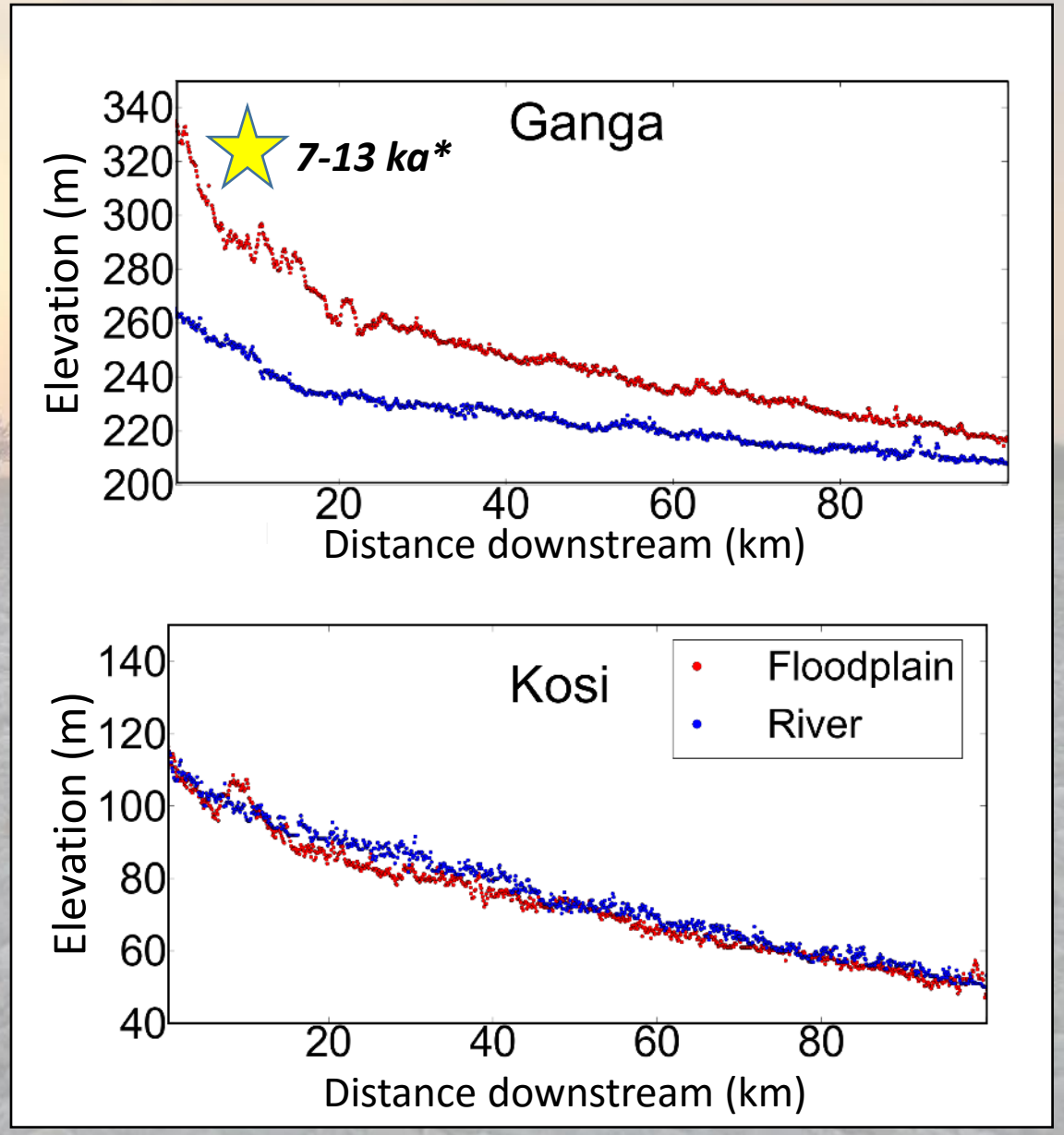
Grain size and fining rates





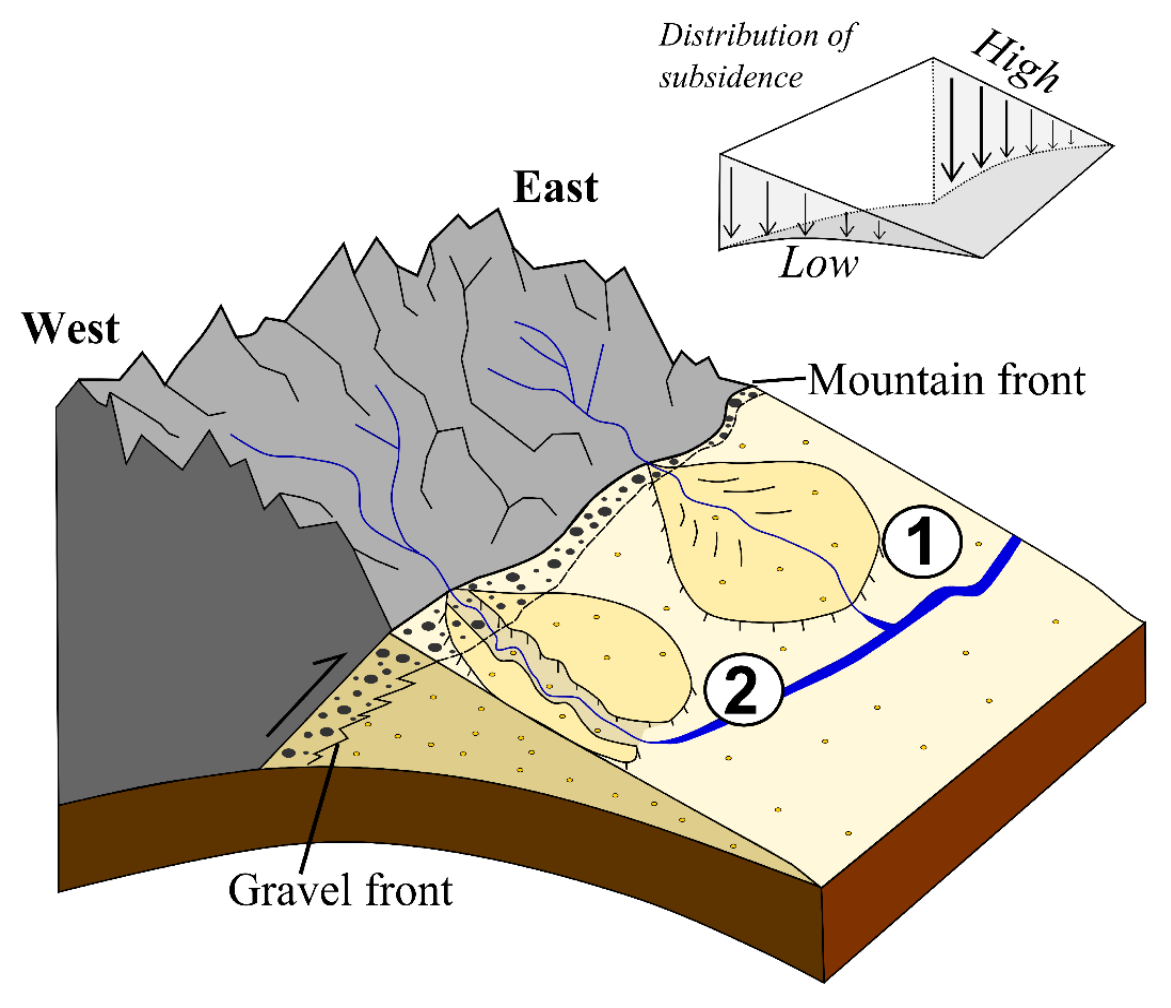
Incision Vs Aggradation

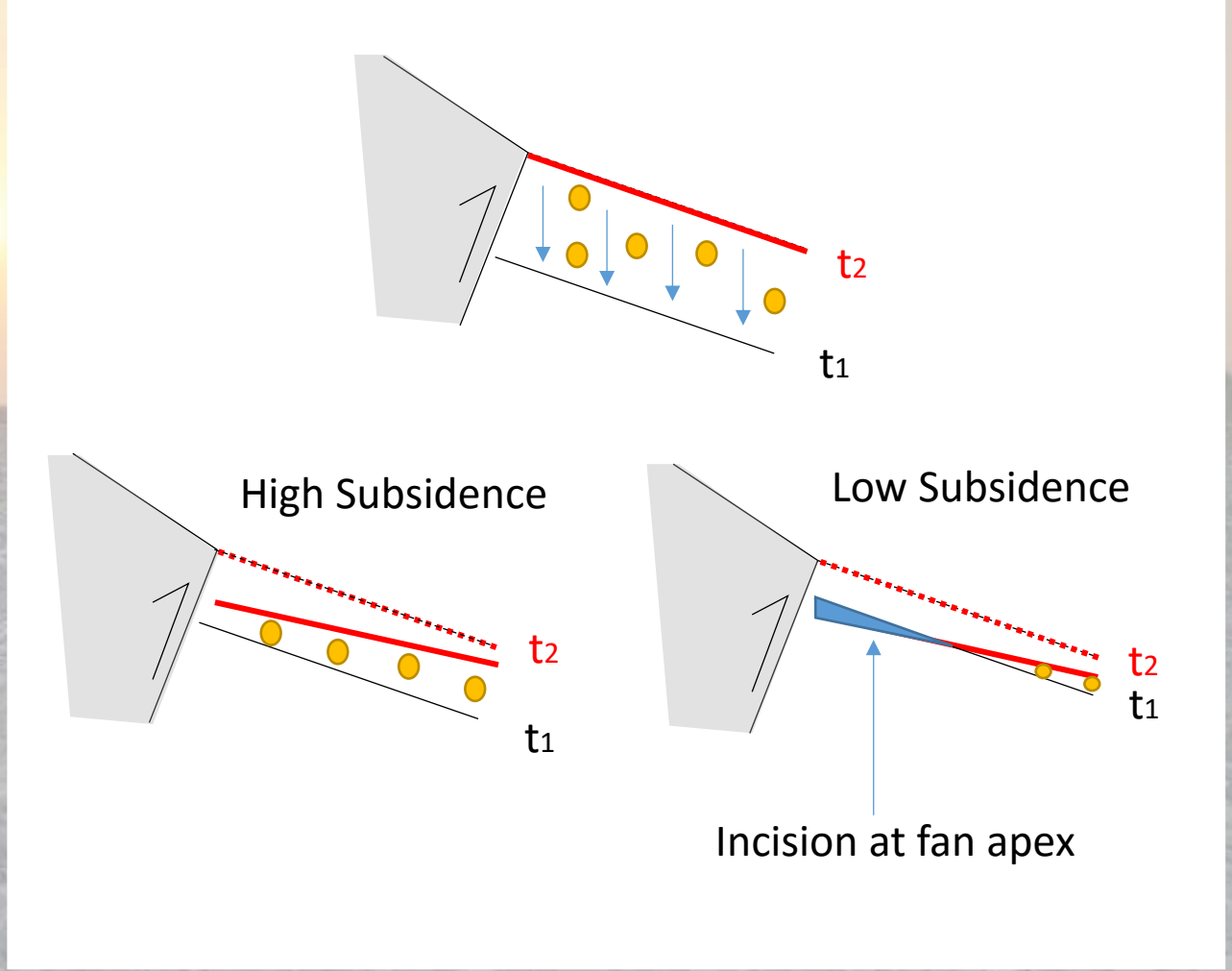




*summarized in Ray and Srivastava (2010)

Incision Vs Aggradation





Conclusions

- Morphology – new swath analysis reveals 3D changes
- Along strike variation in subsidence velocity and grain size fining rates

Subsidence is key to determining how sensitive morphology is to regional/global climate change?

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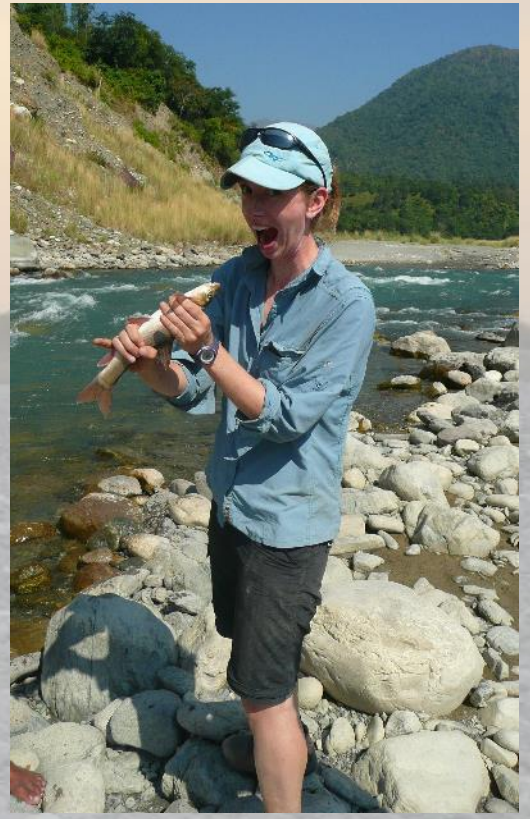

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