

# Sediment-triggered meander deformation in the Amazon Basin

Joshua Ahmed, José A. Constantine & Thomas Dunne





# Chapter 1

Jose A. Constantine, Thomas Dunne, Carl Legleiter & Eli D. Lazarus

## **Sediment and long-term channel and floodplain evolution across the Amazon Basin**

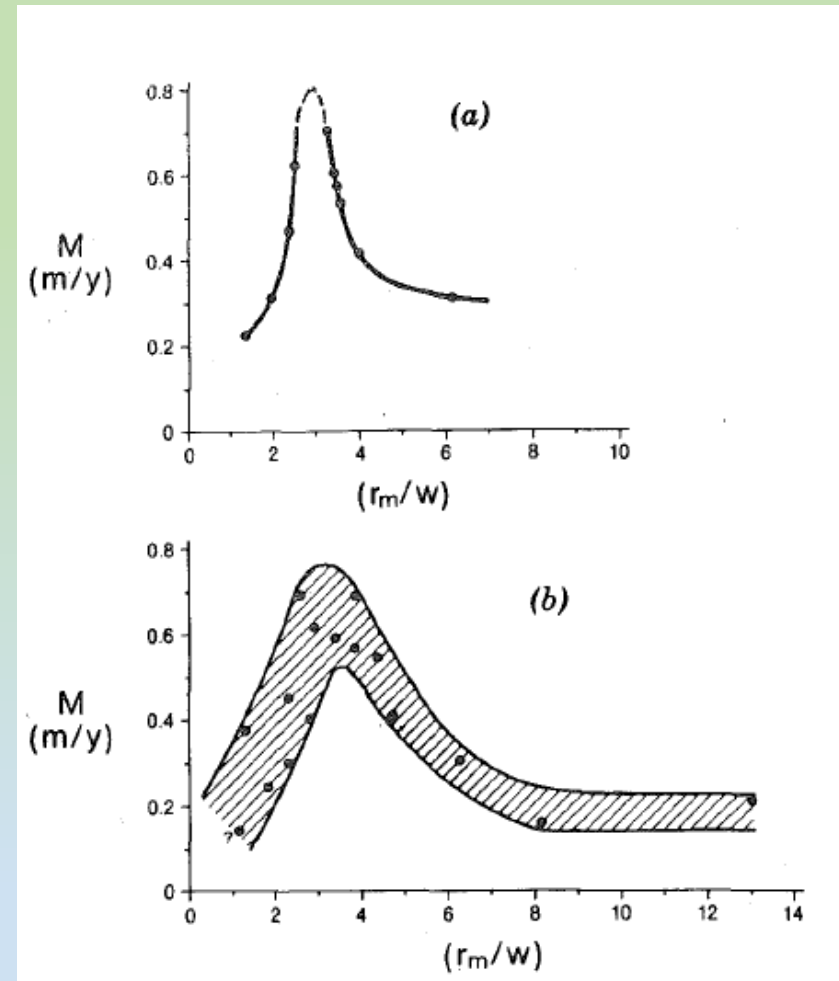


# Meandering rivers & their importance



# Controls on meander migration

- Curvature
- Discharge
- Floodplain composition
- Vegetation
- **Sediment?**



# Alluvial sediment

- The substrate **transported through** our river systems
- The substrate that **builds numerous bedforms**, the bedforms that **create habitats**, the same material that **creates the floodplains** on which we build and extract our resources. Yet there is supposedly no real connection between this and channel morphodynamics?



# The Role of Sediment Transport and Sediment Supply in the Evolution of River Channel and Floodplain Complexity

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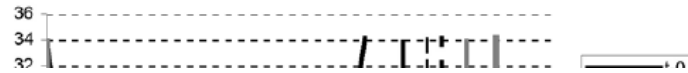
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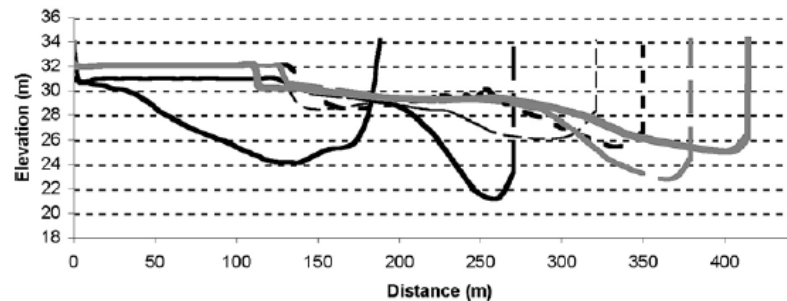
## FLOW AND SEDIMENT TRANSPORT IN A SAND BEDDED MEANDER<sup>1</sup>

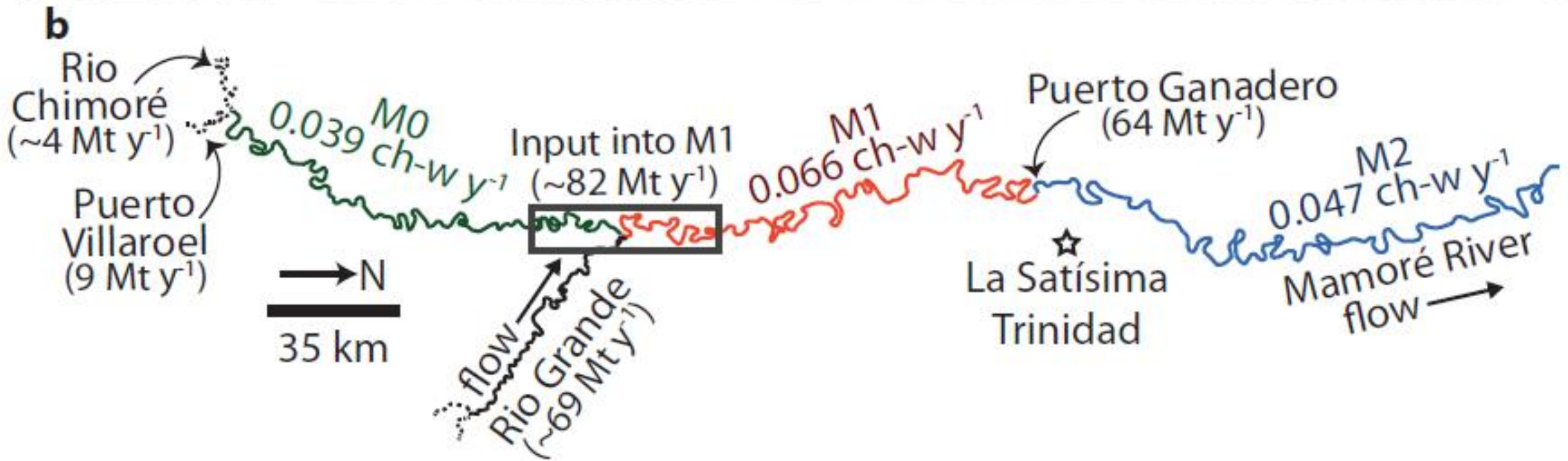
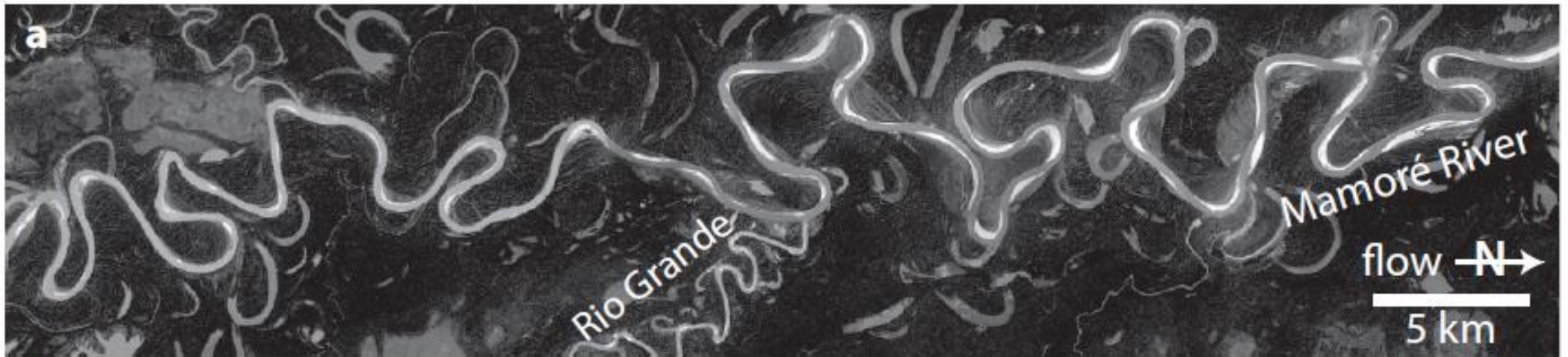
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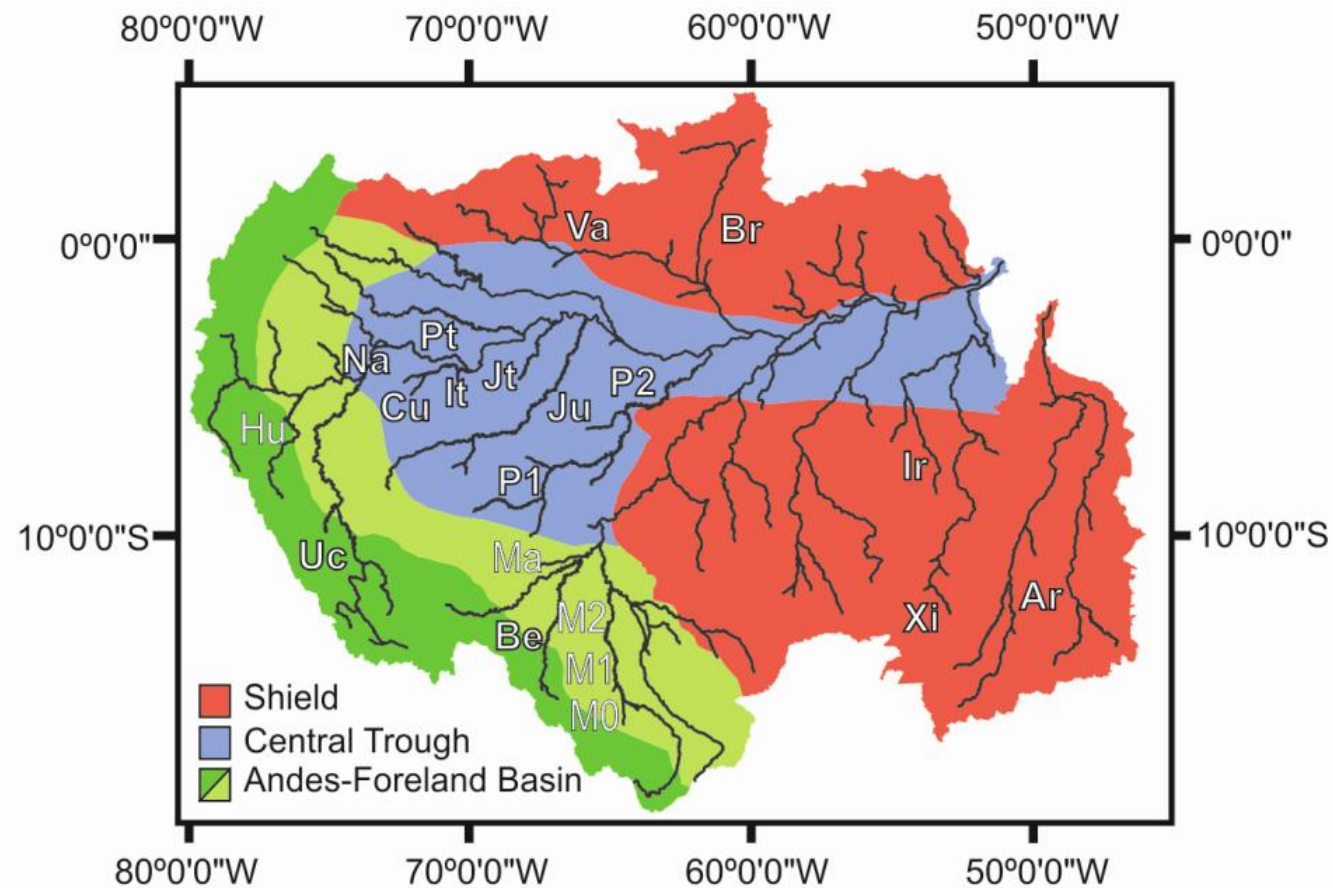
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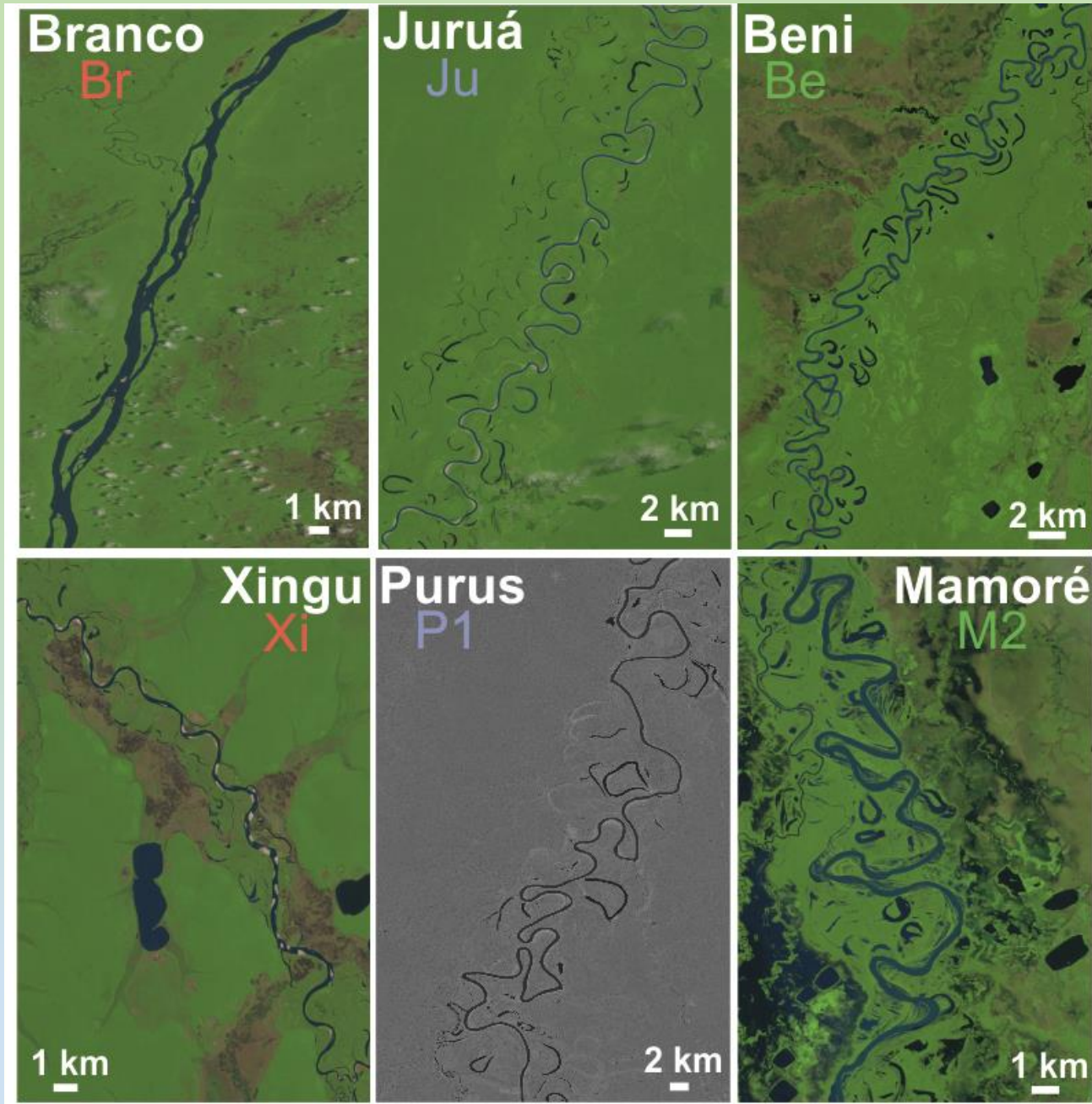


# Study site: Amazon Basin



Ar = Araguaia; Va = Vaupés; Br = Branco; Ir = Iriti; Xi = Xingu; P1 = Purus 1;  
P2 = Purus 2; Ju = Juruá; Jt = Jutai; It - Ituí; Cu = Curuca; Na = Nanay; Pt = Putumayo; M0 = Mamoré0;  
M1 = Mamoré1; M2 = Mamoré2; Be = Beni; Uc = Ucayali; Hu = Huallaga; Ma = Madre de Días



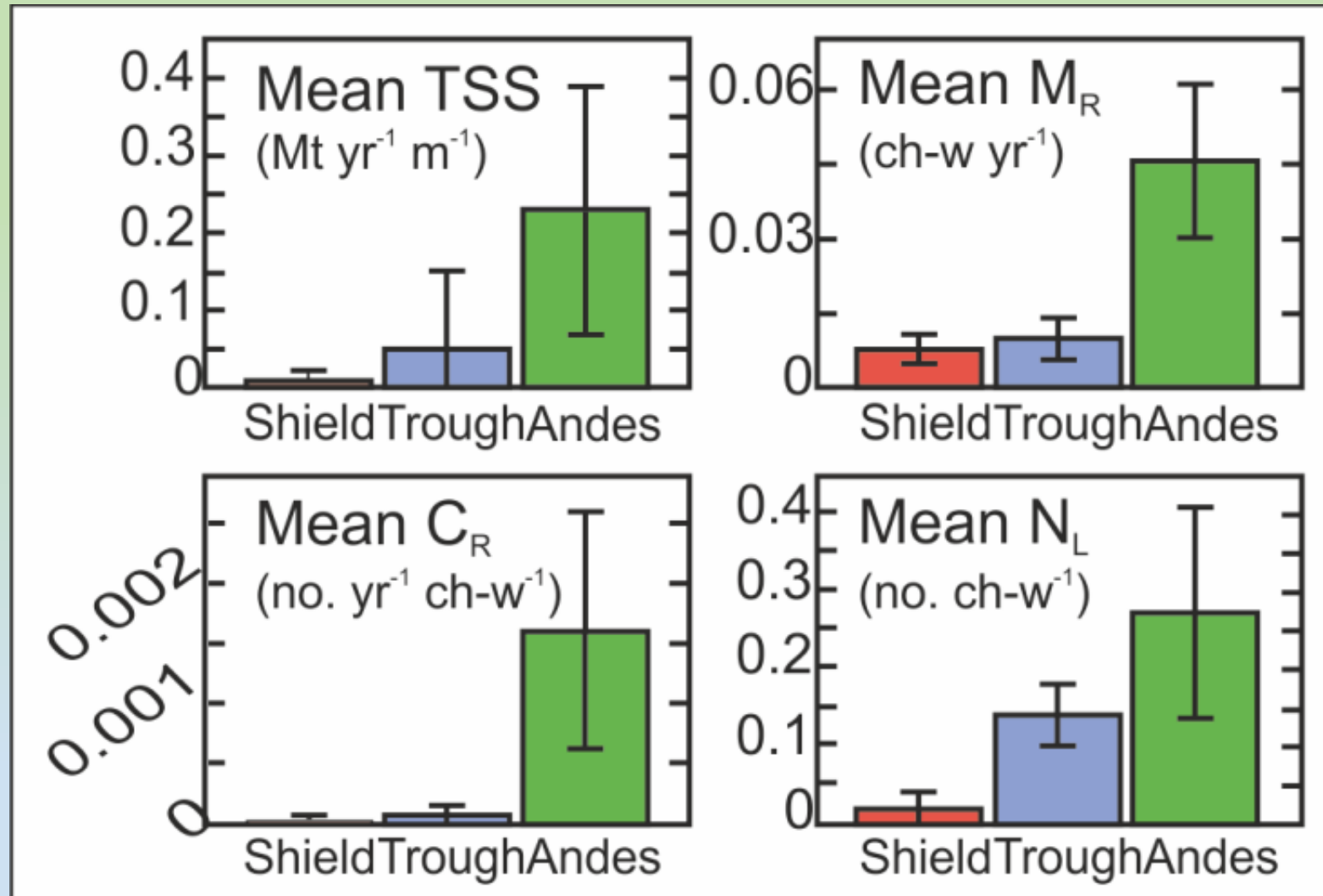


# What we did

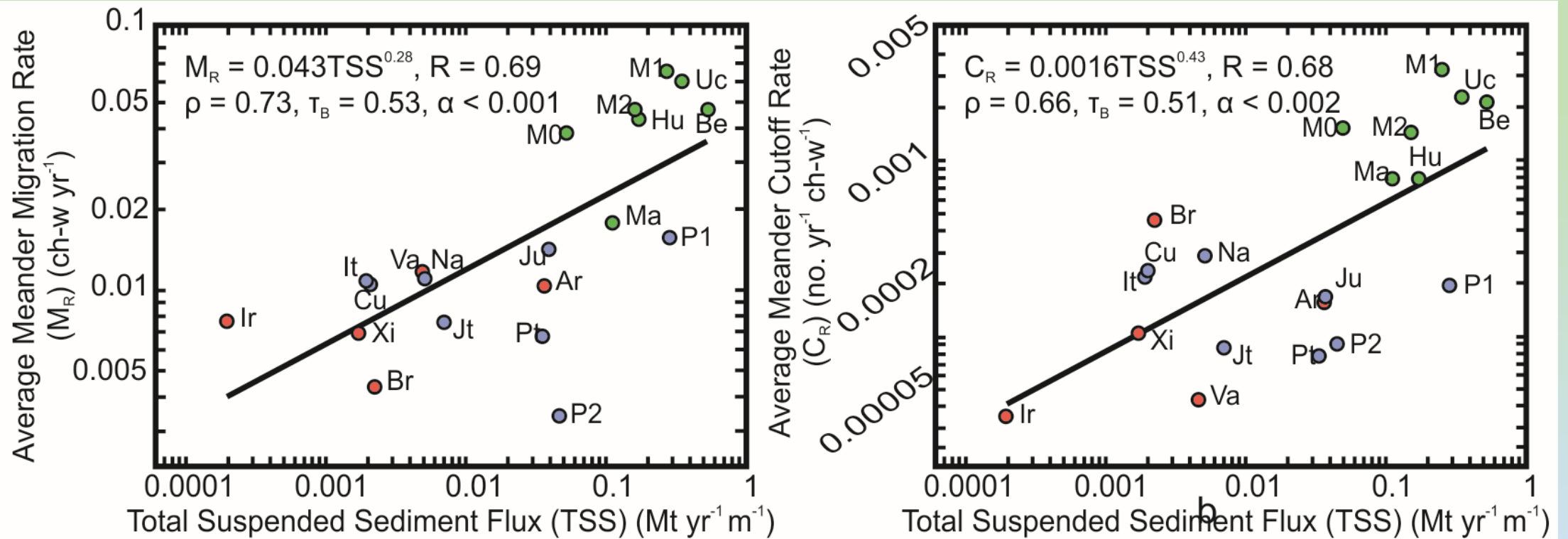
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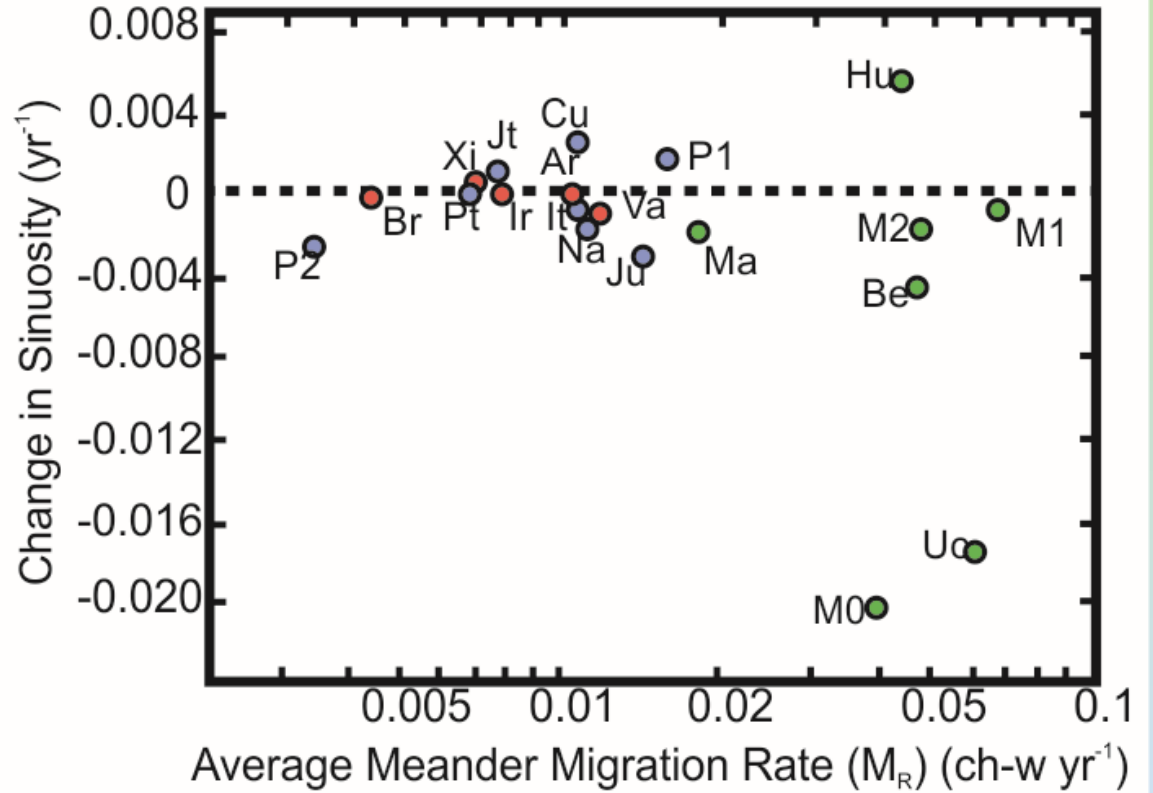
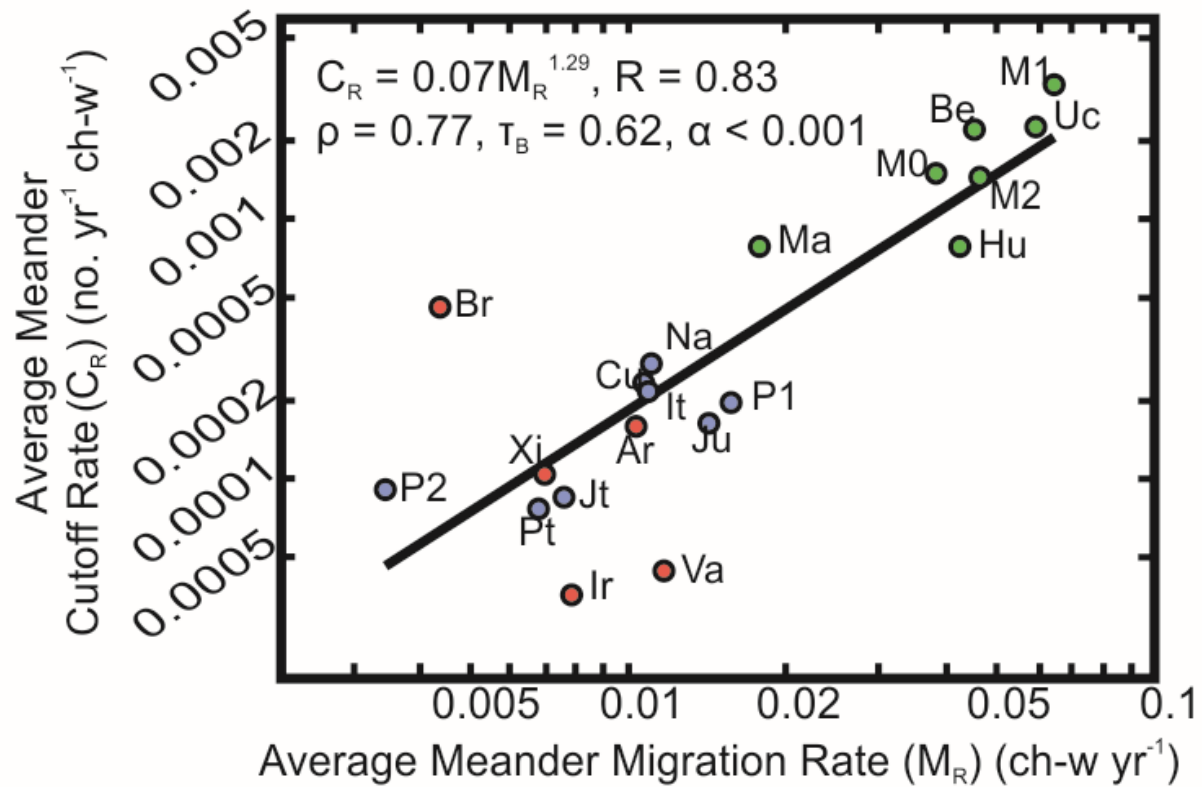
# Results



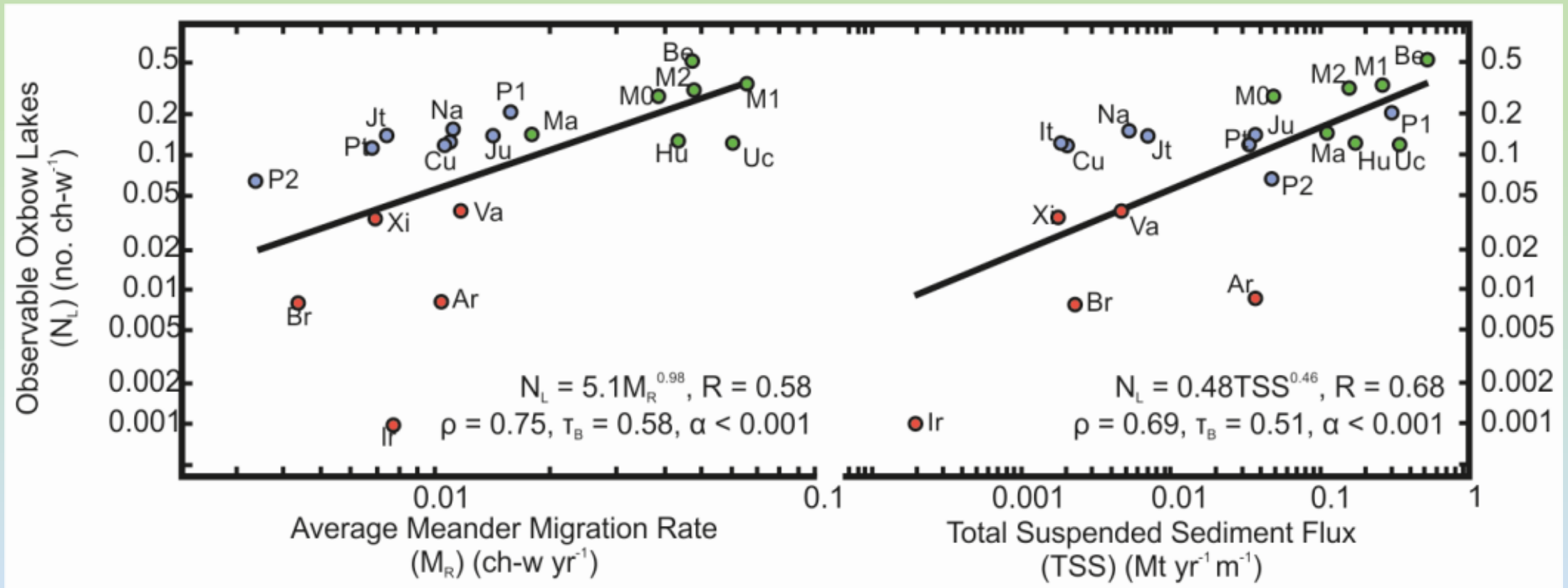
# Results



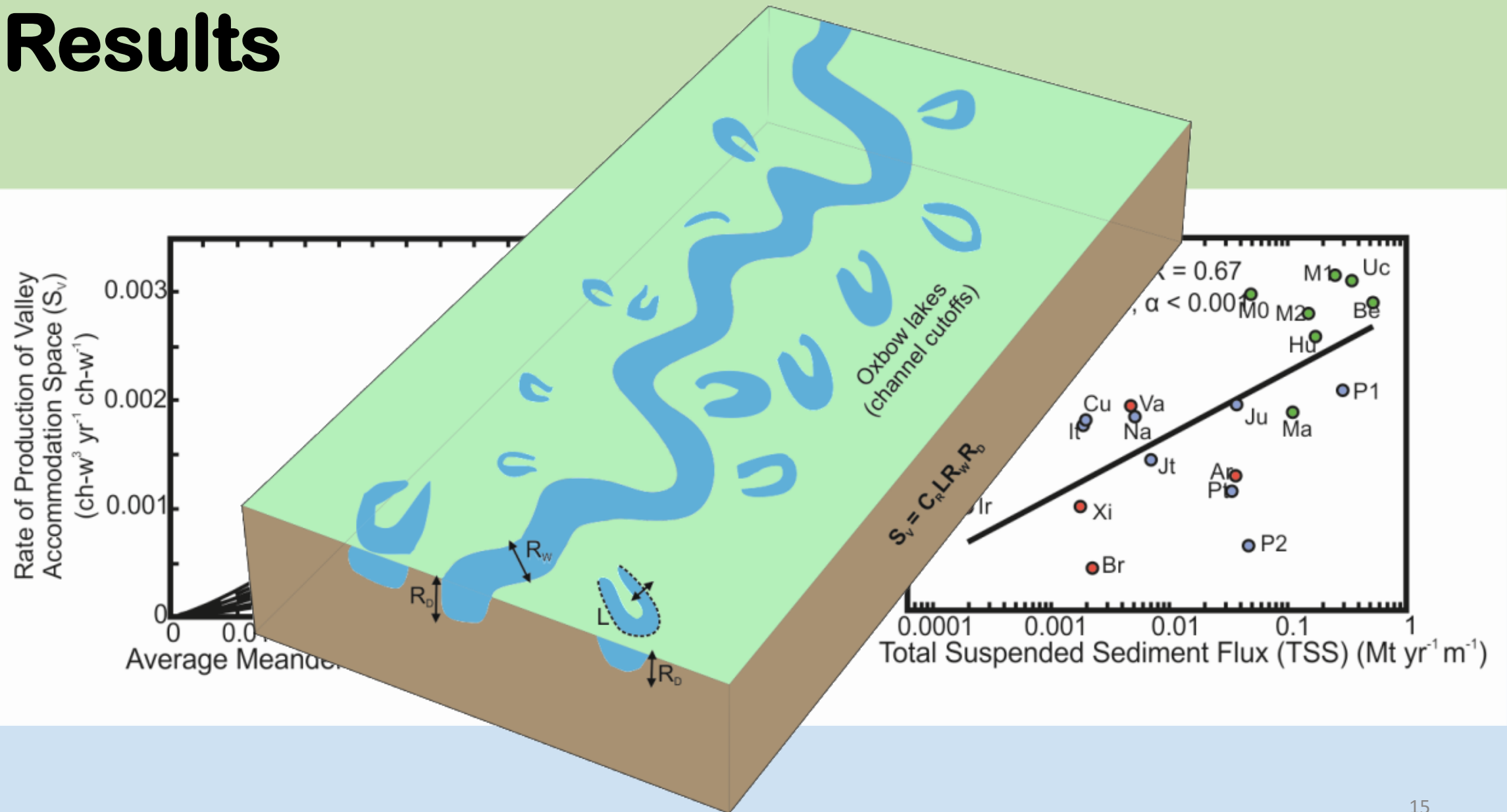
# Results



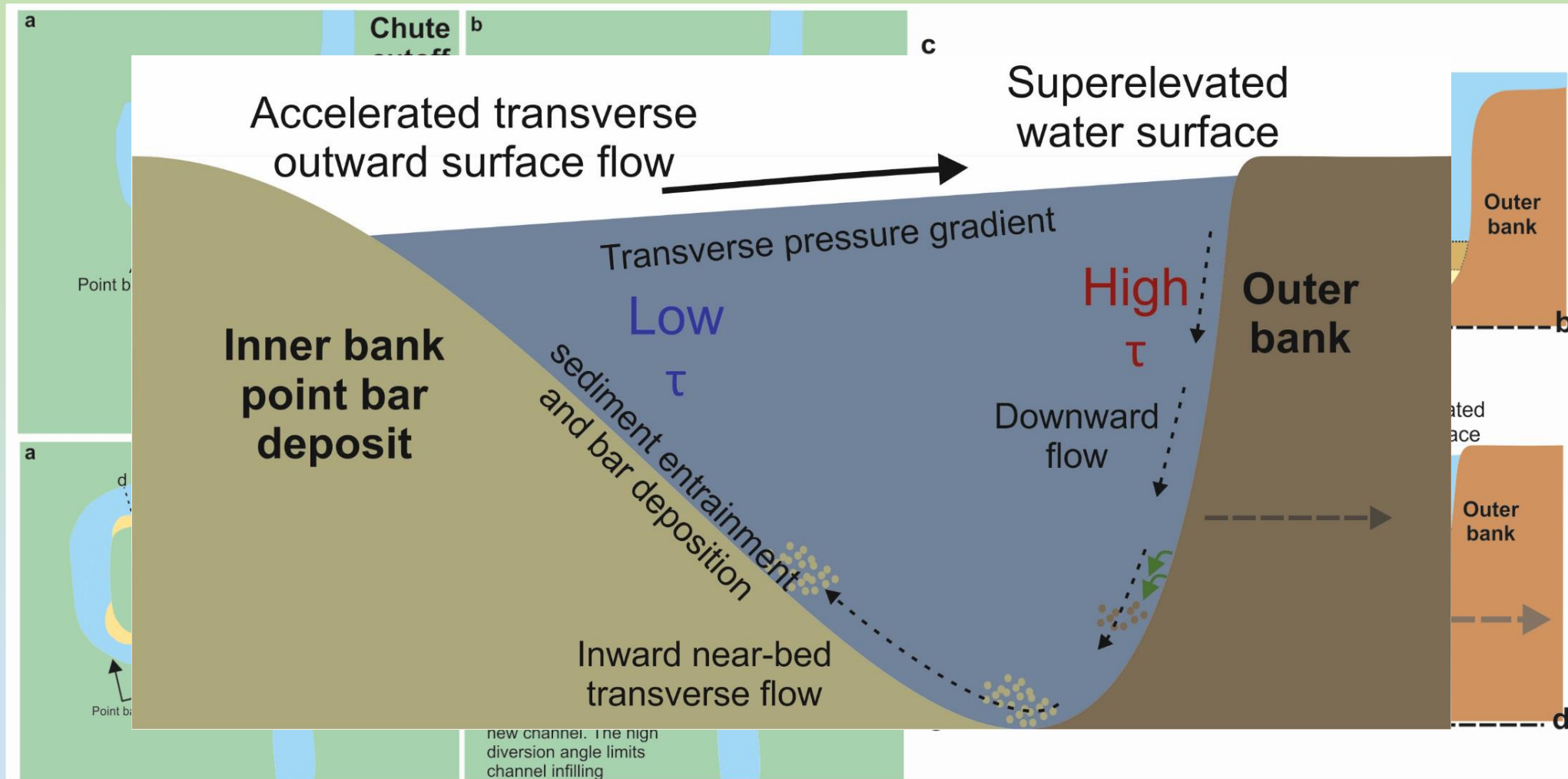
# Results



# Results



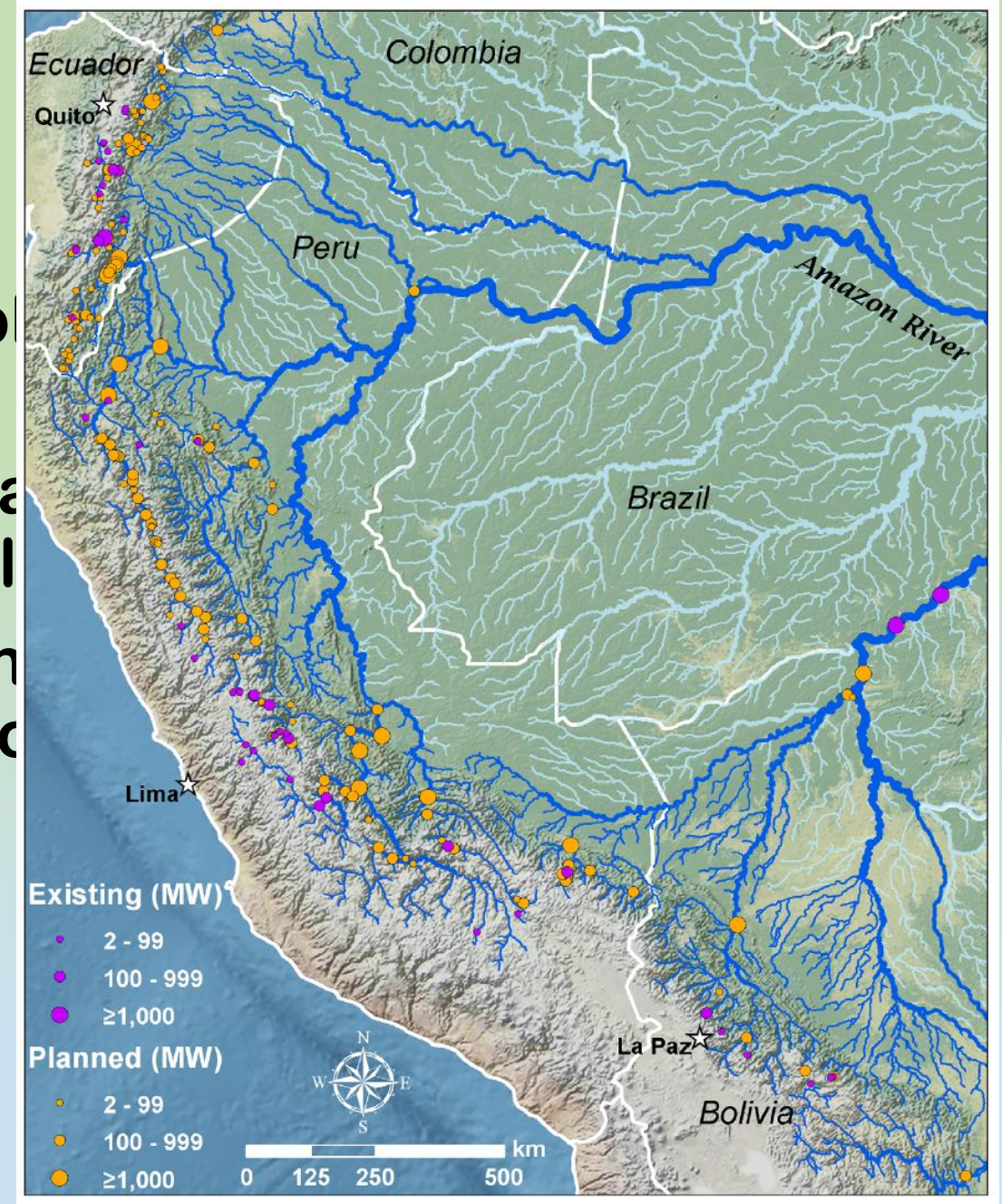
# Proposed mechanisms





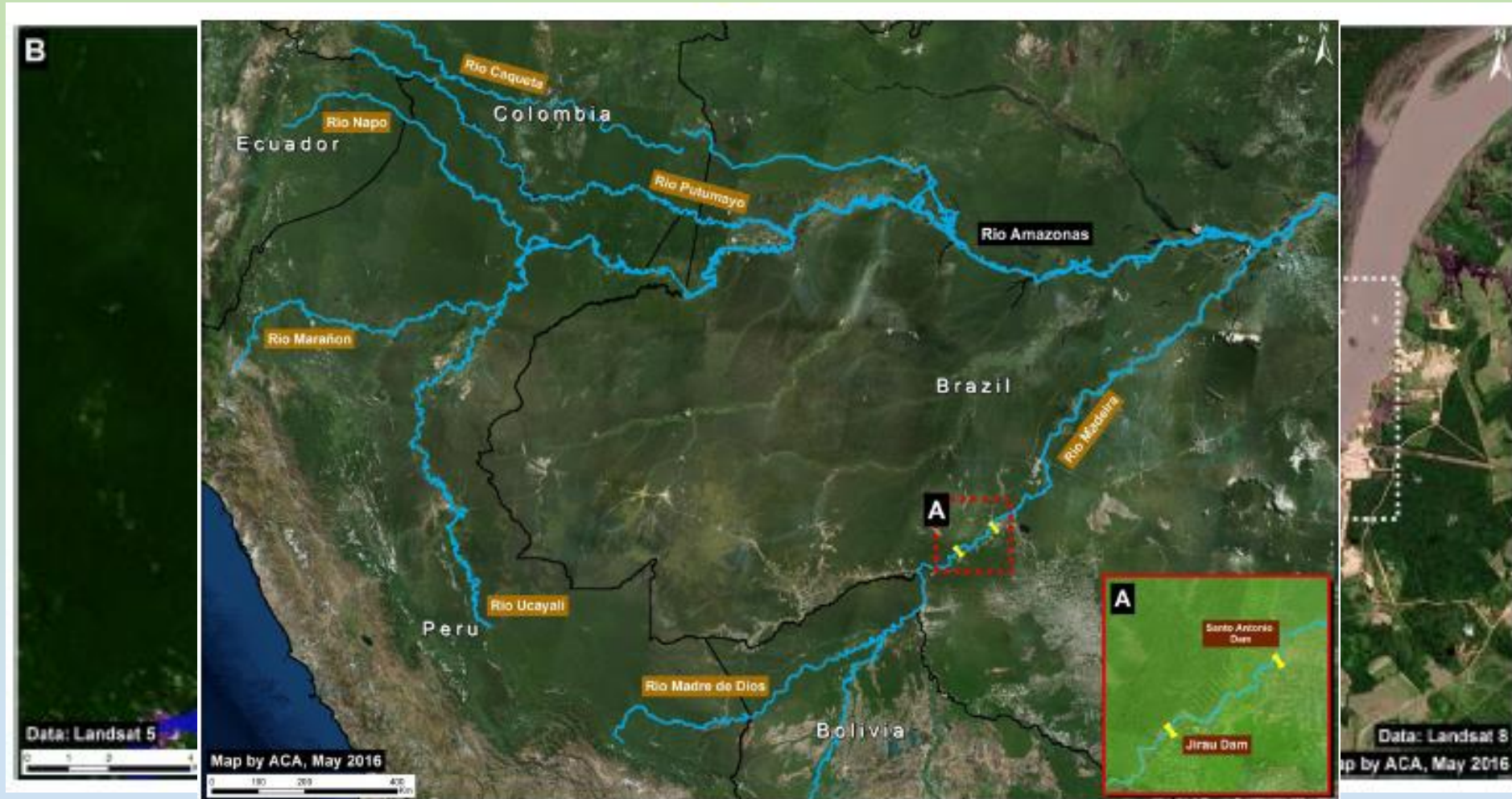
# Summary

- Rivers with high sediment supply generate more cutoffs
- Greater populations of oxbow lakes mean larger voids in the floodplains
- Greater numbers of voids mean more accommodation space (to be occupied)
- **DAMS – connectivity**
- **Rich diversity of habitats**



# Dam, Maderia

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# For further information

nature  
geoscience

LETTERS

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## Sediment supply as a driver of river meandering and floodplain evolution in the Amazon Basin

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# For more information

Ahmed et al. In prep

i.e., coming soon... to a journal near you

## References

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