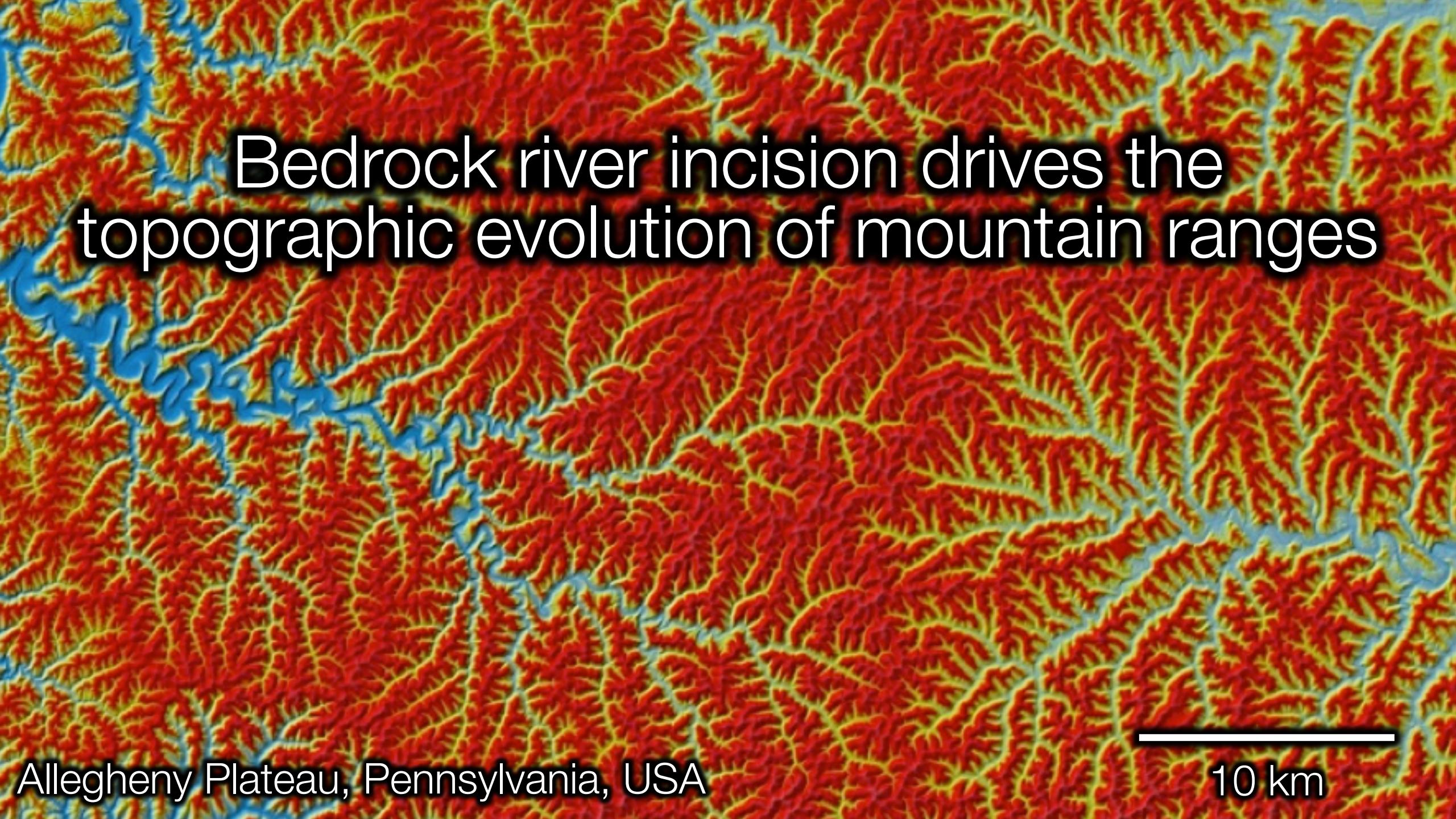


Bedrock river incision



Canjoharie Creek, New York, USA



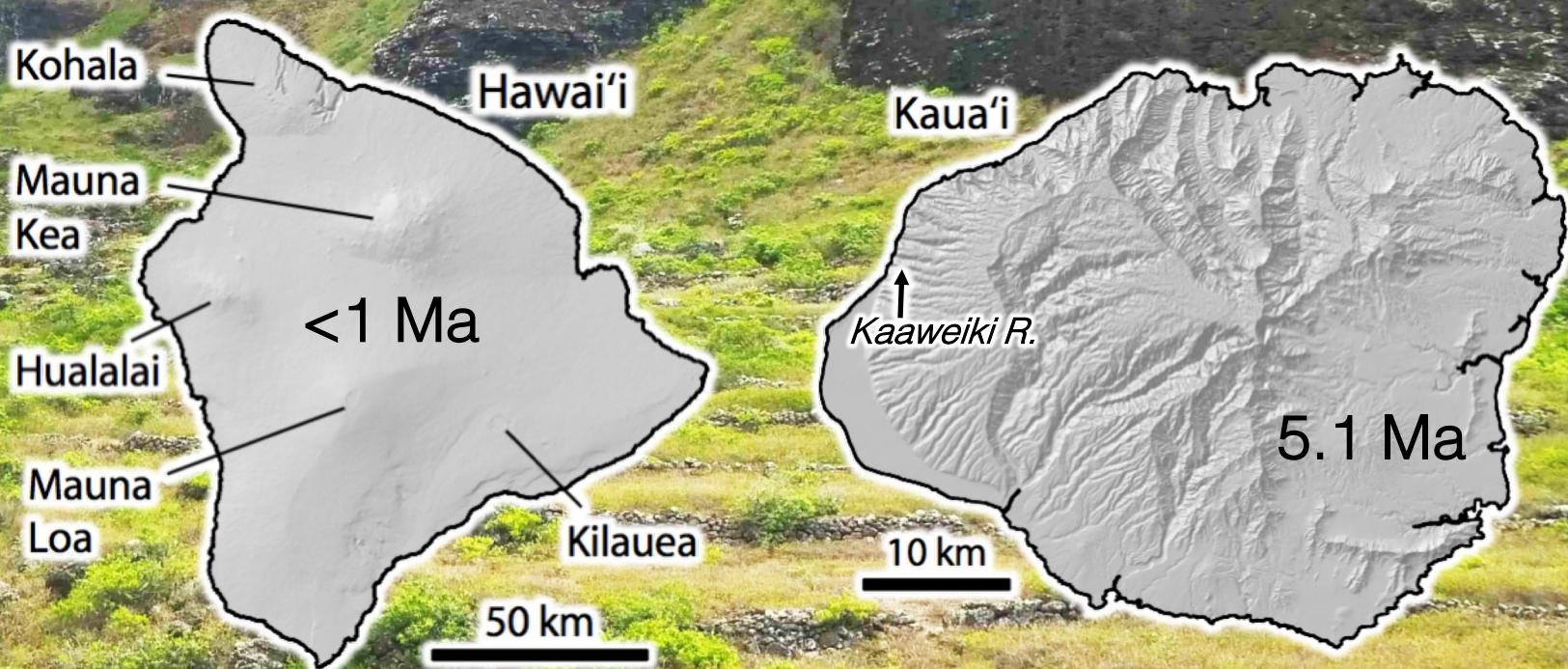
Bedrock river incision drives the topographic evolution of mountain ranges

Allegheny Plateau, Pennsylvania, USA

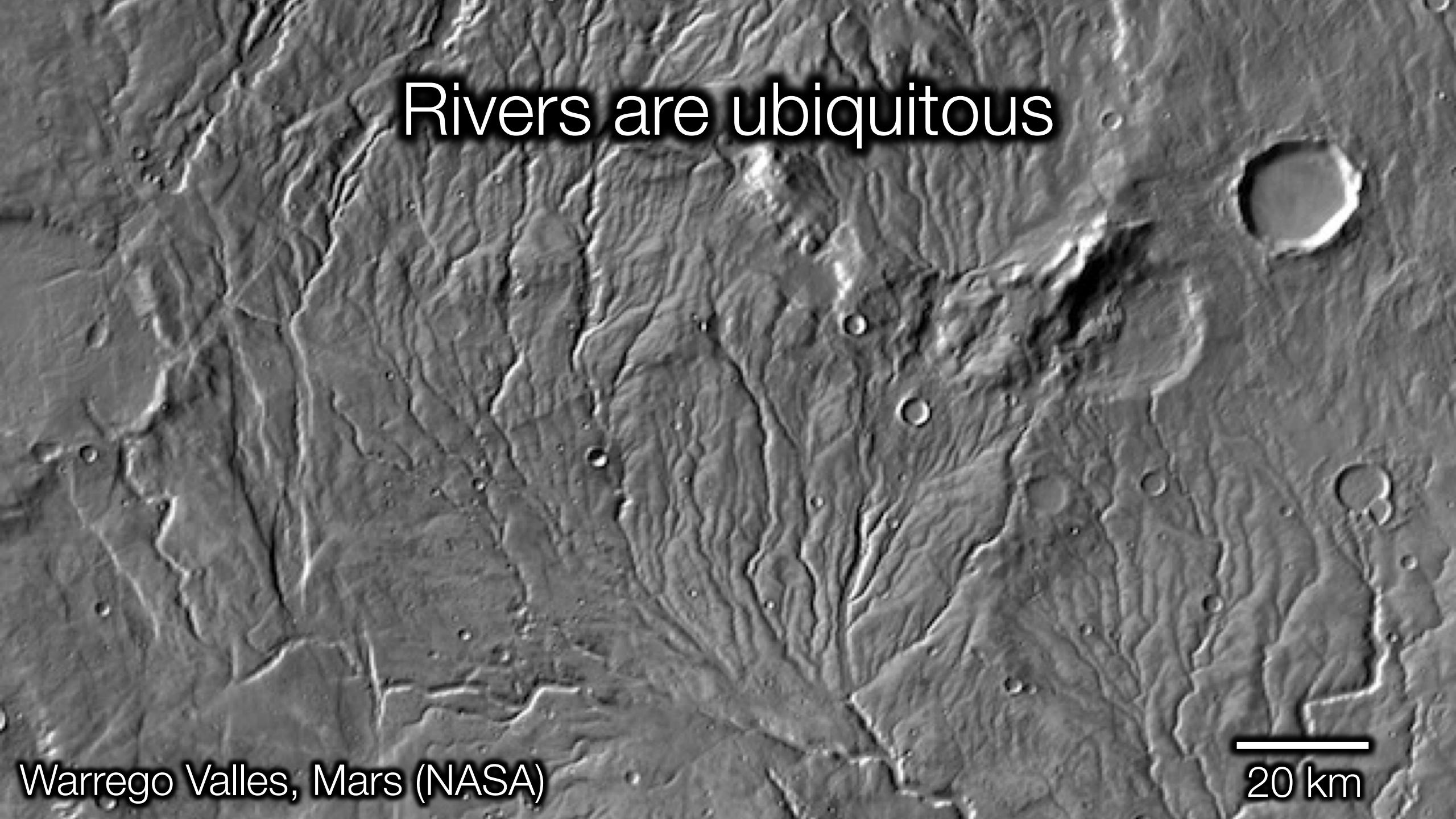
10 km

Kaaweiki River, Kaua'i,
Hawaiian Islands, USA

Rivers create diverse,
dissected topography



Jefferson et al. 2014

A grayscale image of the Martian surface, specifically the Warrego Valles region. The terrain is characterized by a dense network of dark, winding channels and ridges, indicating a history of flowing water. The channels vary in size and density, creating a complex pattern across the landscape.

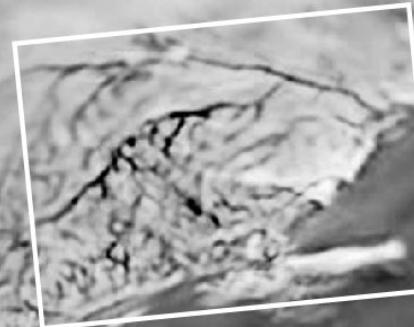
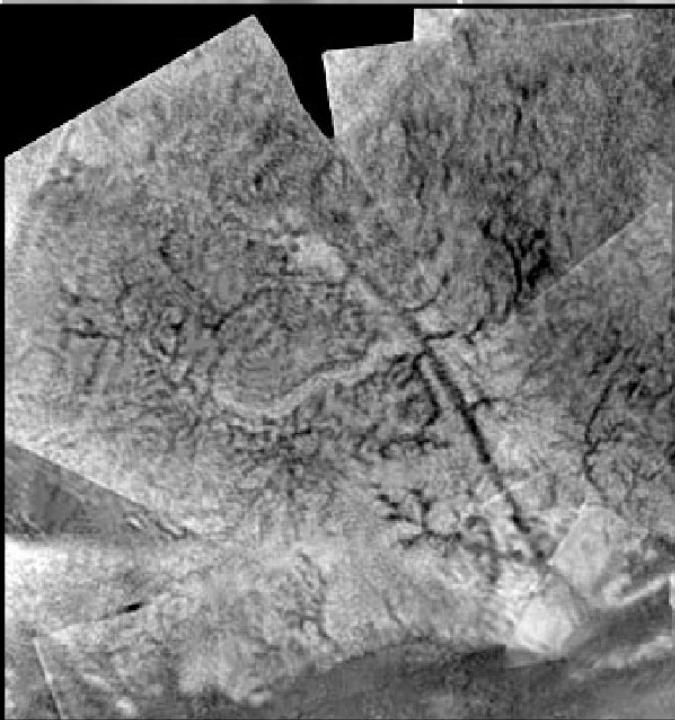
Rivers are ubiquitous

Warrego Valles, Mars (NASA)

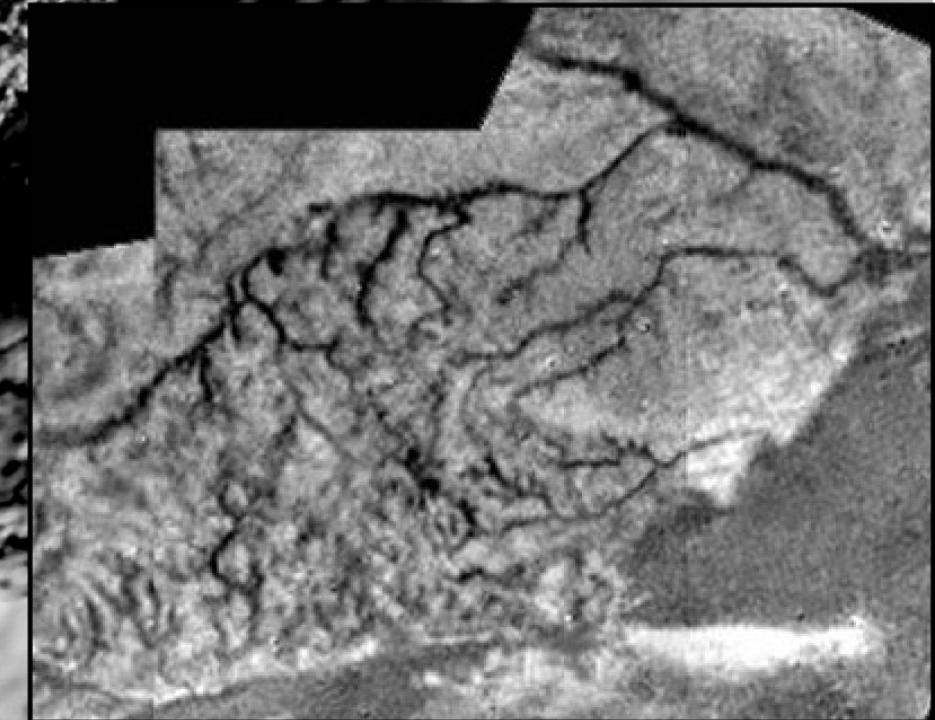
20 km

Huybers Probe Landing Site,
Titan (NASA)

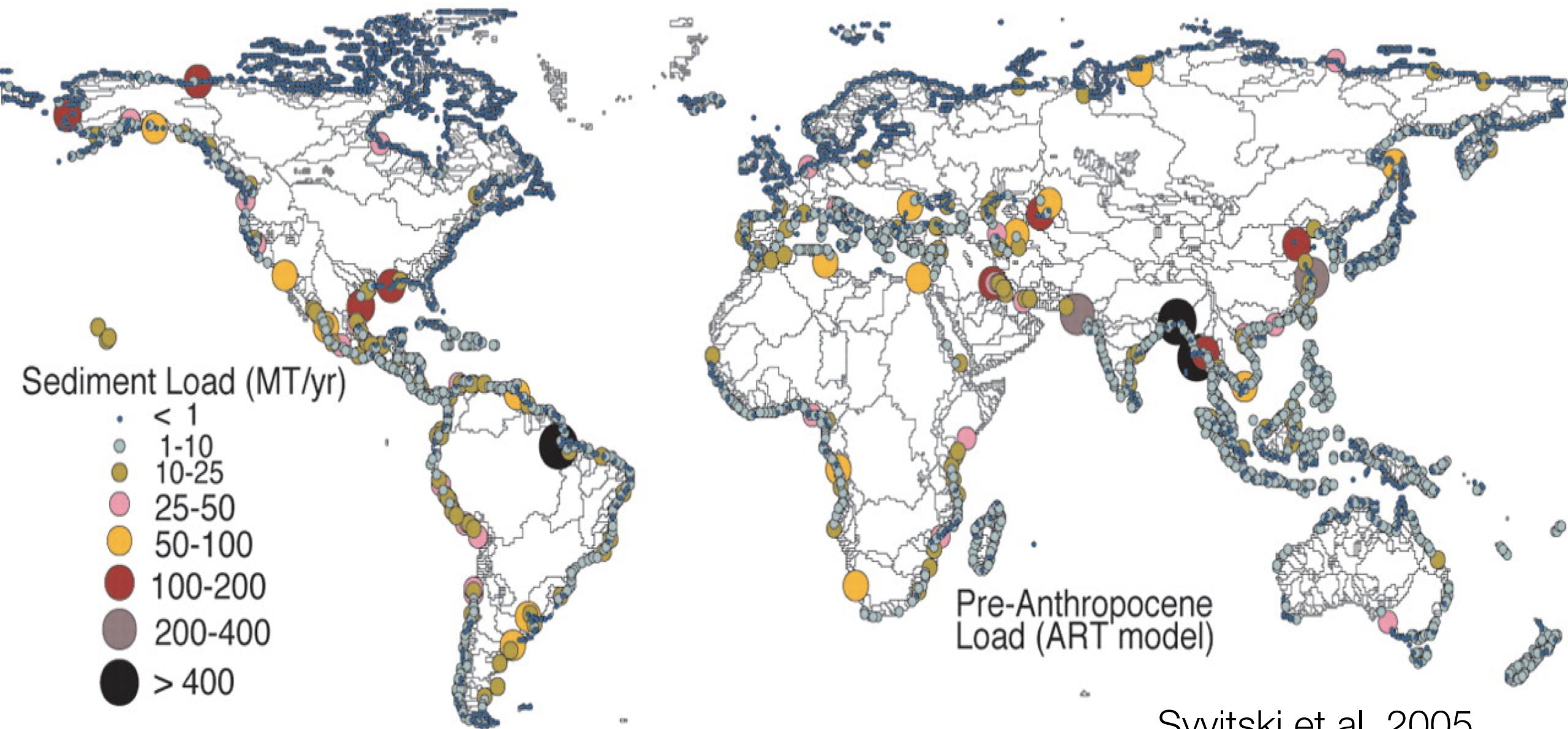
Rivers are
ubiquitous



5 km



Rivers are responsible for most of the mass fluxes across continents



Syvitski et al. 2005

Transport-limited vs. detachment-limited channels

Transport-limited



Sediment supply > Transport capacity

Divergence in sediment flux controls changes in elevation and channel geometry

Detachment-limited



Transport capacity > Sediment supply

Incision rate limited by rate at which flow can detach bedrock \propto local shear stress

Waimakariri River, New Zealand (J. Piirto)

Jin Jiang River, Tibet (W. Ouimet)