



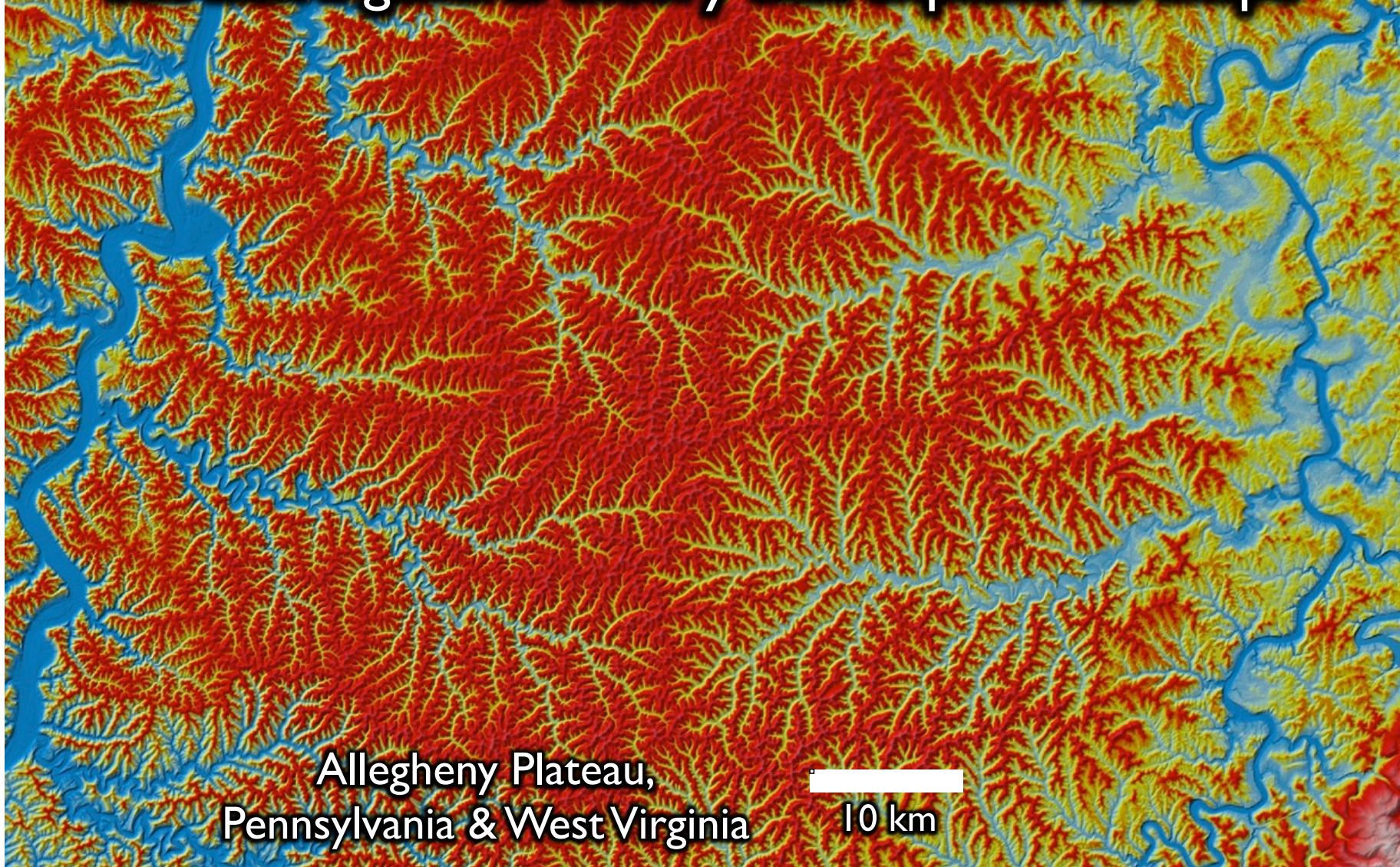
# Rivers

12.001 – November 14, 2012

Courtesy of Taylor Perron. Used with permission.

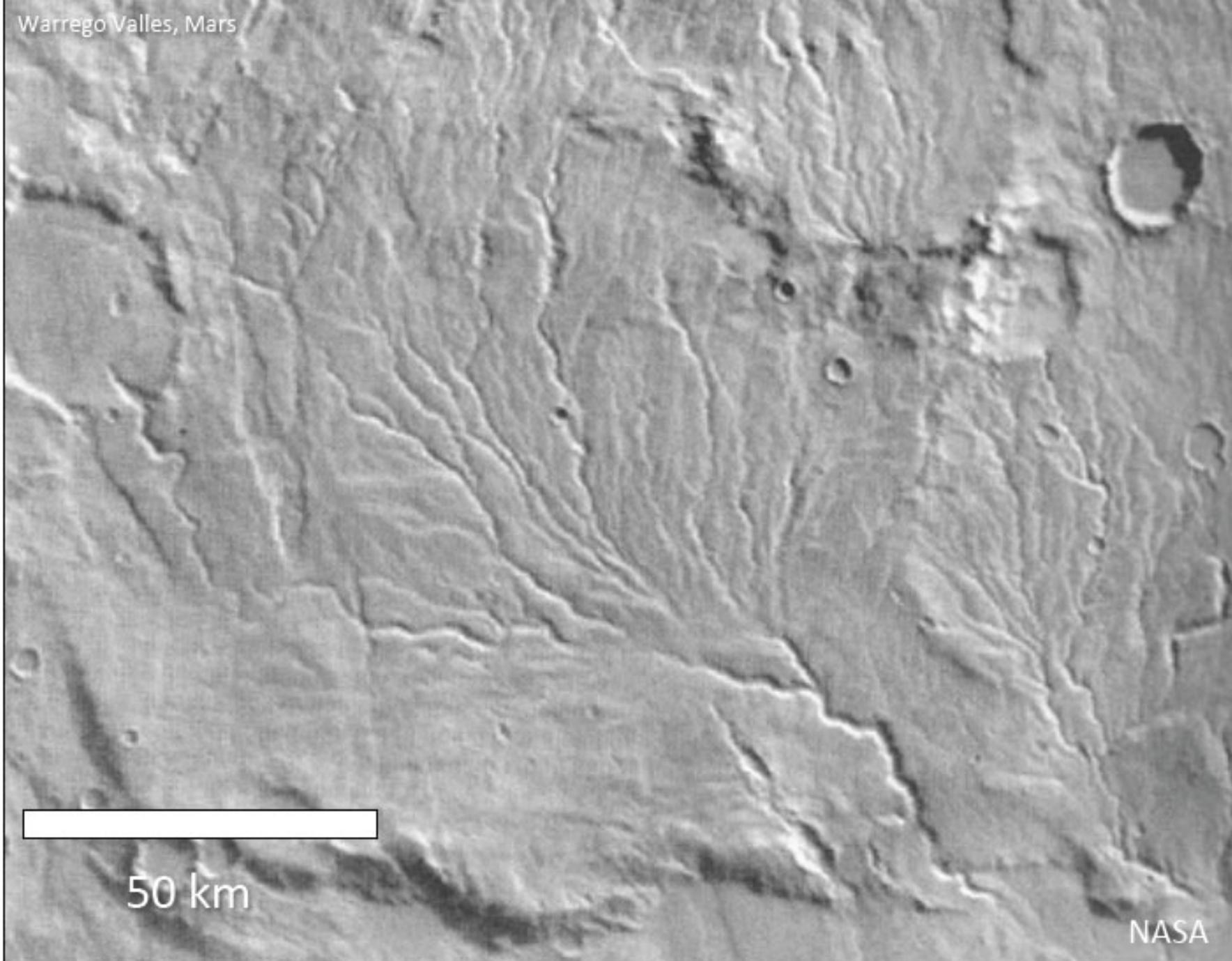
San Juan River, Argentina

We know what the skeleton of a landscape looks like,  
but lack a general theory that explains its shape



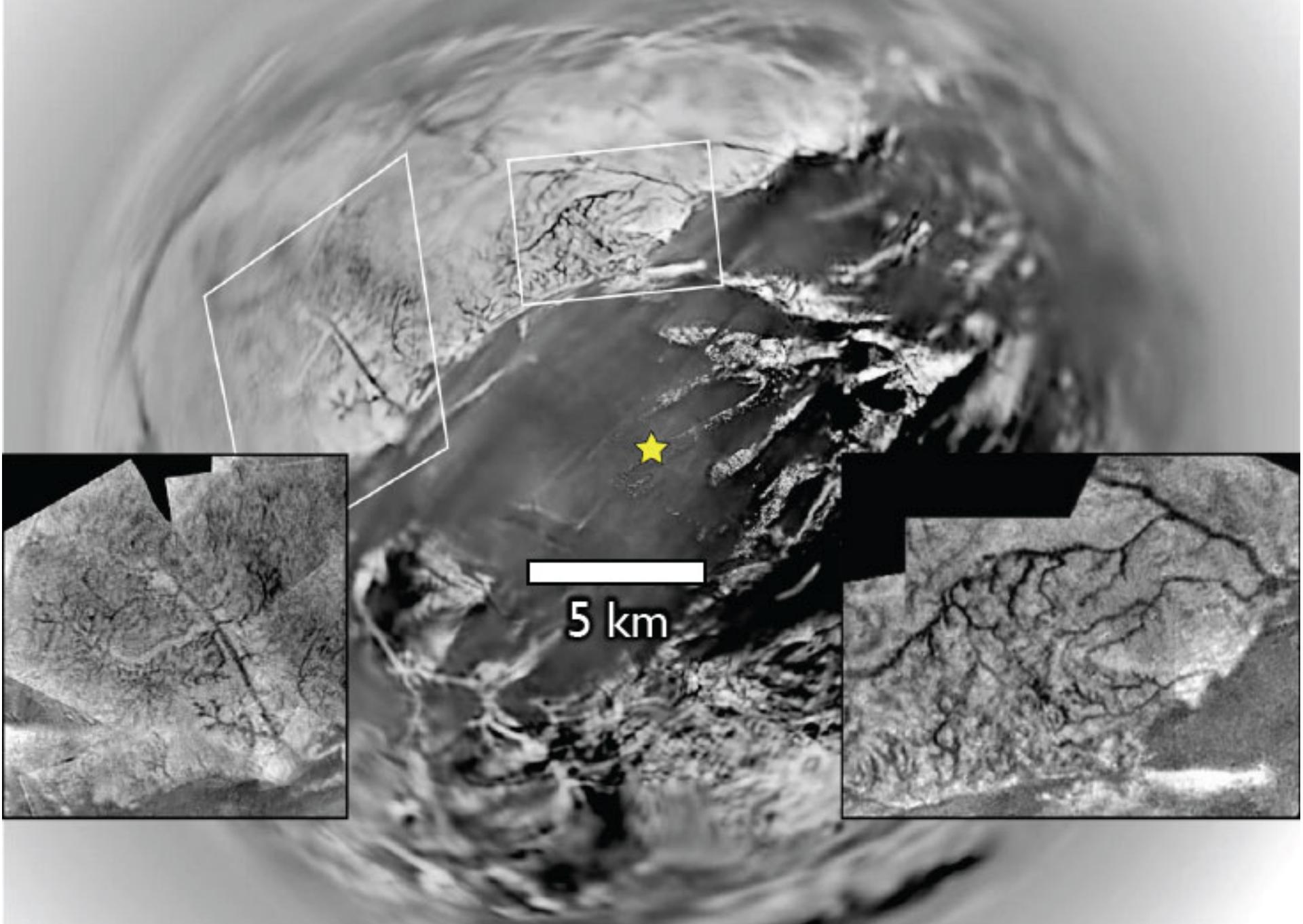
Courtesy of Taylor Perron. Used with permission.

Warrego Valles, Mars



50 km

NASA



Courtesy of NASA. Image in the public domain.



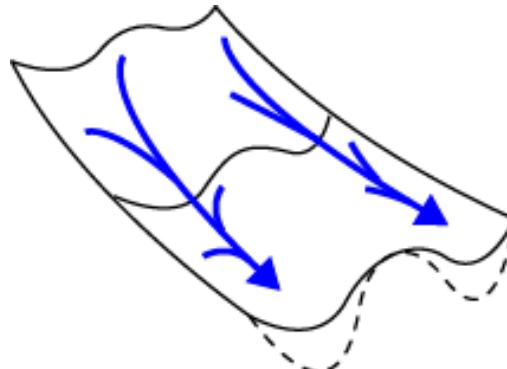
Gabilan Mesa, CA

Courtesy of Taylor Perron. Used with permission.

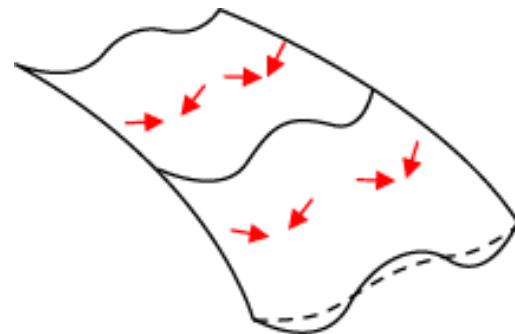


© source unknown. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.

# erosion = river incision + soil creep



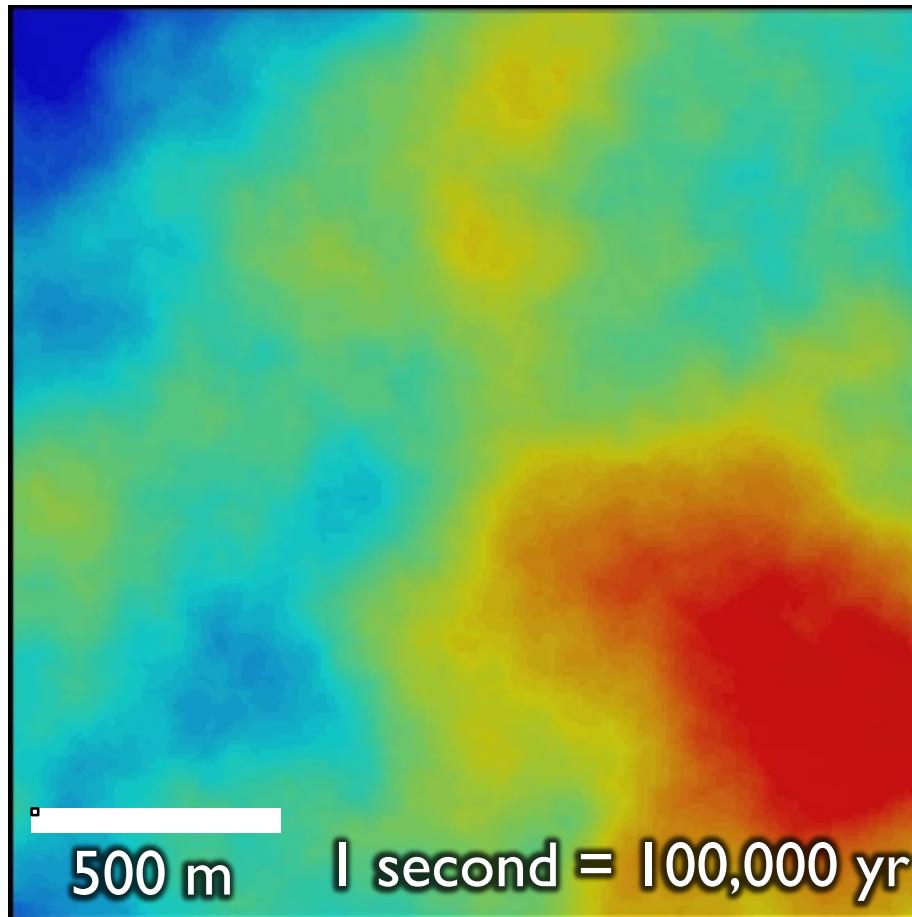
Valleys grow deeper



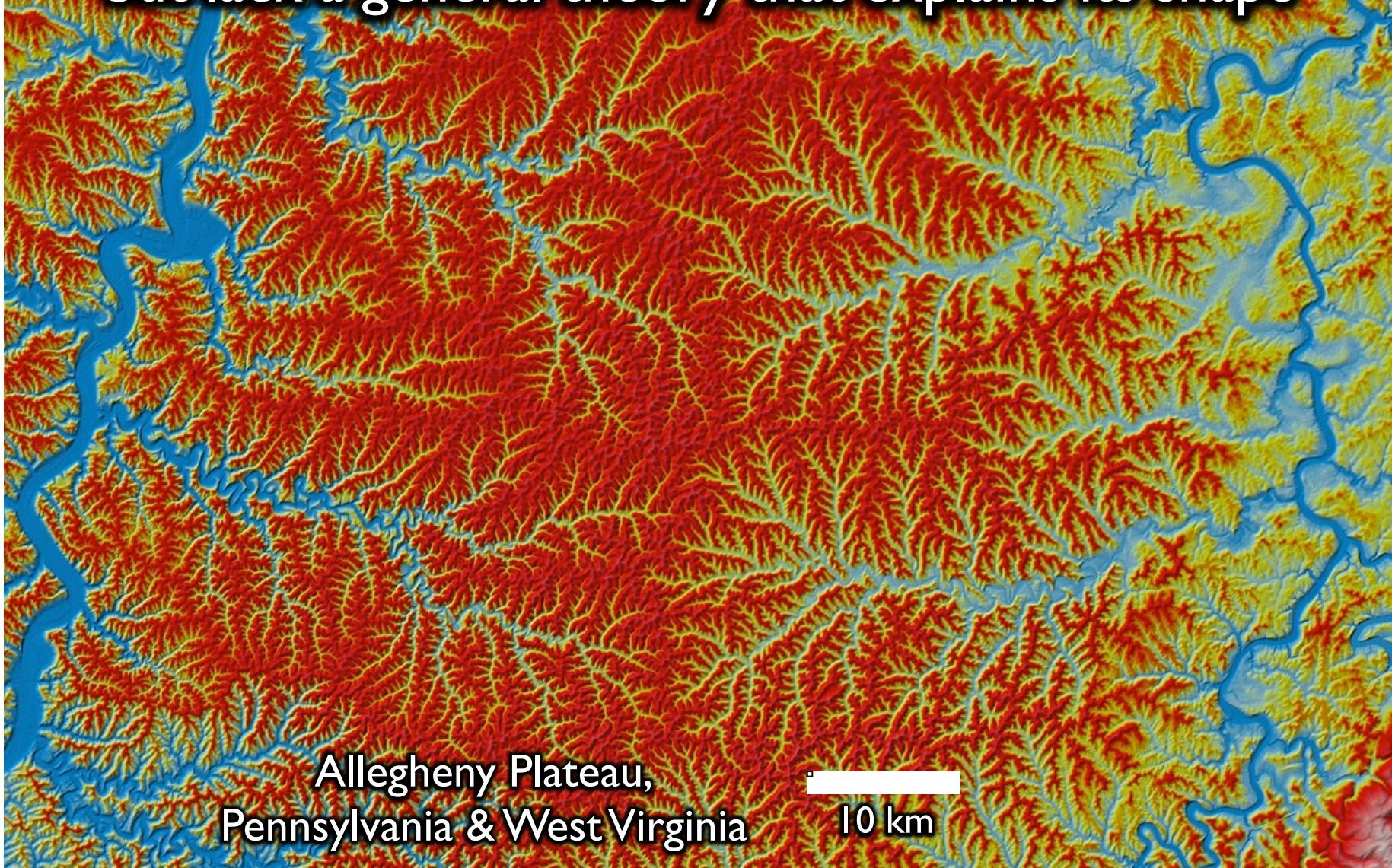
Valleys fill in

Mathematical models based on this simple competition generate dynamic, branching river networks

Warmer colors = higher elevation



We know what the skeleton of a landscape looks like,  
but lack a general theory that explains its shape



Courtesy of Taylor Perron. Used with permission.



Image courtesy of Google

© Google. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.

McGeary, U. South Carolina



Courtesy of Jane Piirto. Used with permission.



© David McGeary. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.

Waimakariri River, New Zealand

Jane Piirto, Ashland Univ.



## Birch Creek, Alaska

© source unknown. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.



Courtesy of Jane Piirto. Used with permission.



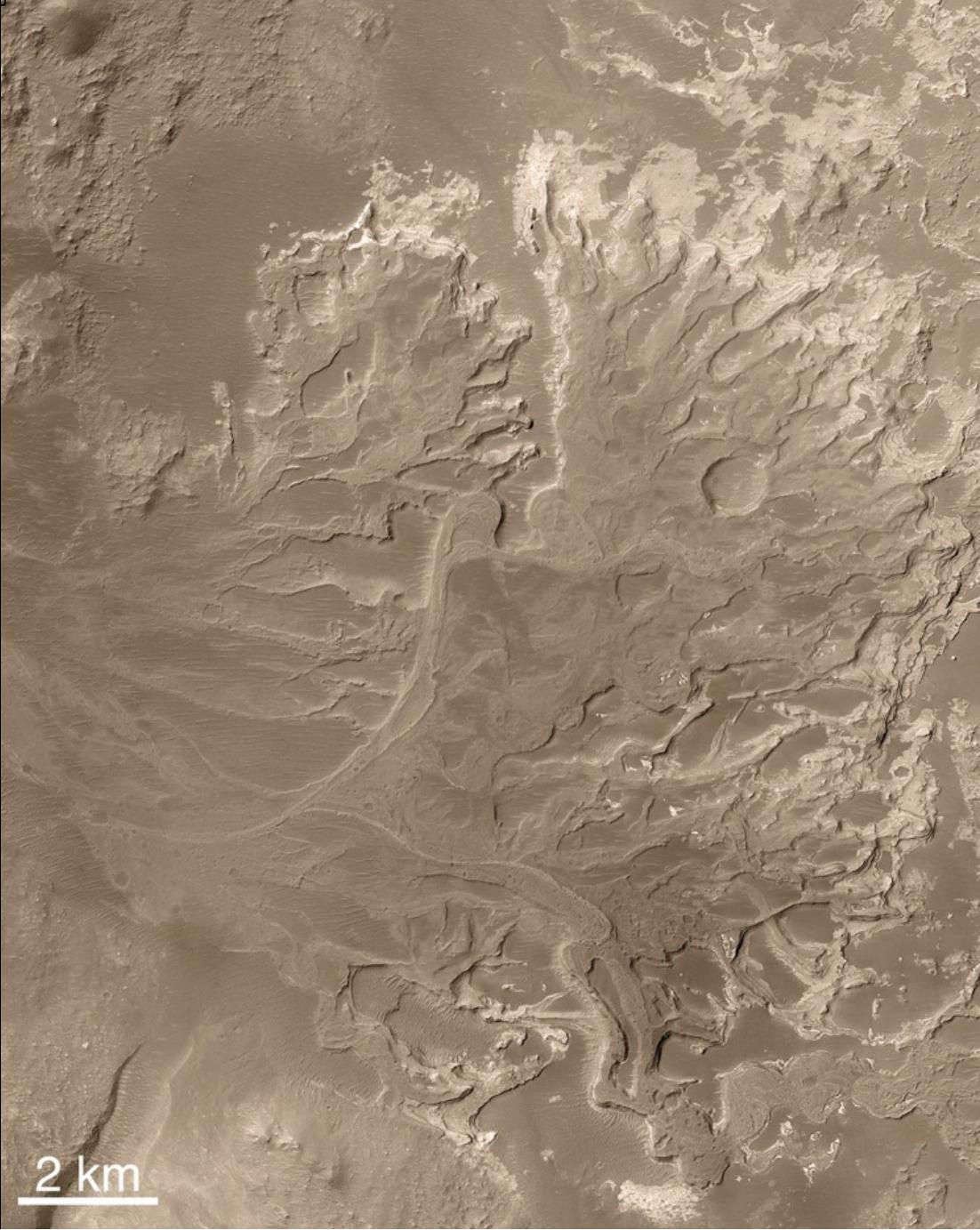
Michal Tal & Chris Paola, *Geology*, 2007

Courtesy of Geological Society of America. Used with permission.  
Source: Tal, Michal, and Chris Paola. "[Dynamic Single-thread Channels Maintained by the Interaction of Flow and Vegetation.](#)" *Geology* 35, no. 4 (2007): 347-50.



Courtesy of Taylor Perron. Used with permission.

San Juan River, Argentina



Courtesy of NASA. Image in the public domain.

# Lena River Delta, Siberia



Courtesy of [NASA](#). Image of the public domain.

# NileDelta

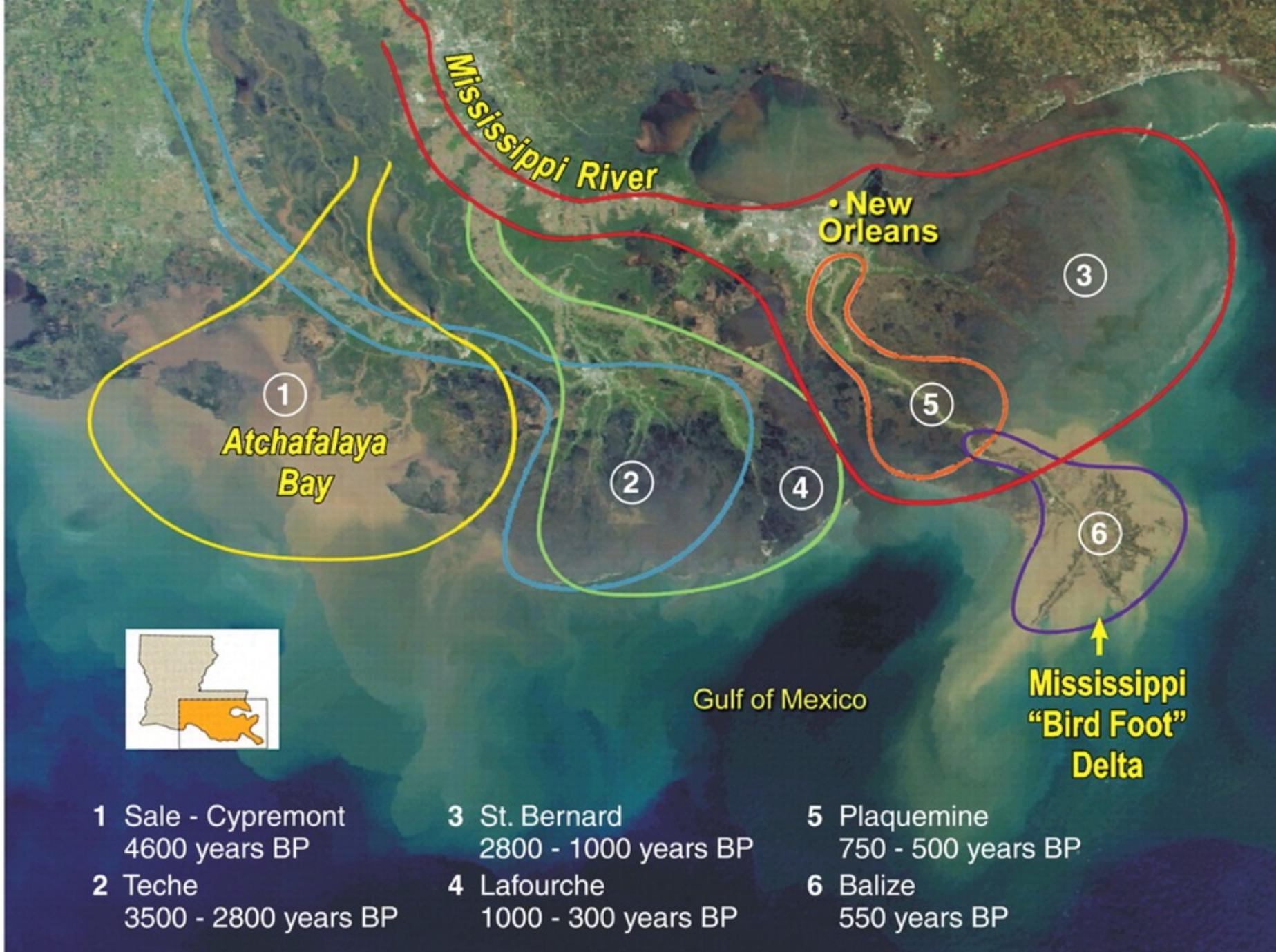


Courtesy of [NASA](#). Image in the public domain.



Figure 14.24c

Courtesy of [NASA](#). Image in the public domain.



1 Sale - Cypremont  
4600 years BP

2 Teche  
3500 - 2800 years BP

3 St. Bernard  
2800 - 1000 years BP

4 Lafourche  
1000 - 300 years BP

5 Plaquemine  
750 - 500 years BP

6 Balize  
550 years BP

**Mississippi  
“Bird Foot”  
Delta**



MIT OpenCourseWare  
<http://ocw.mit.edu>

12.001 Introduction to Geology

Fall 2013

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.