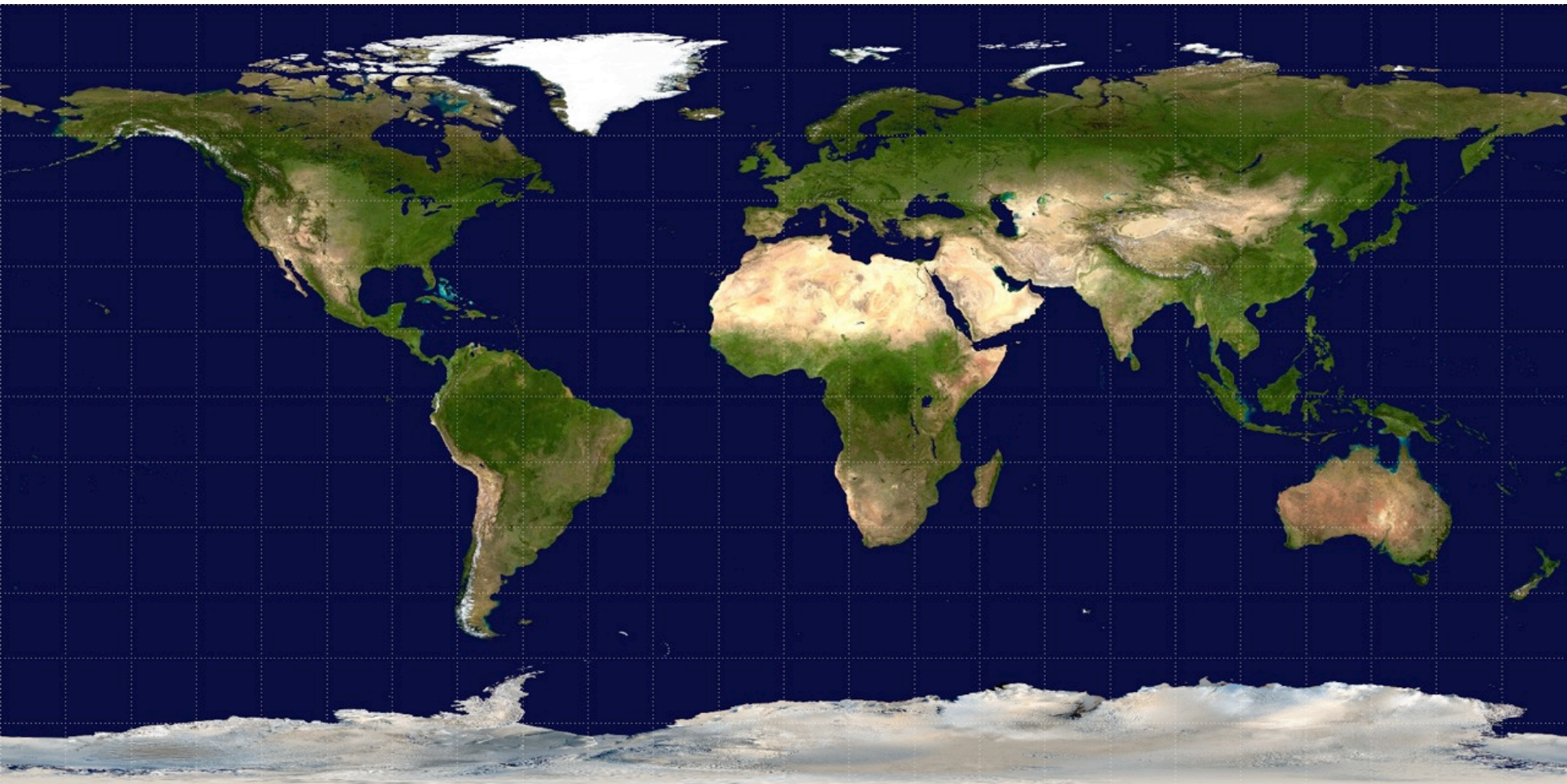


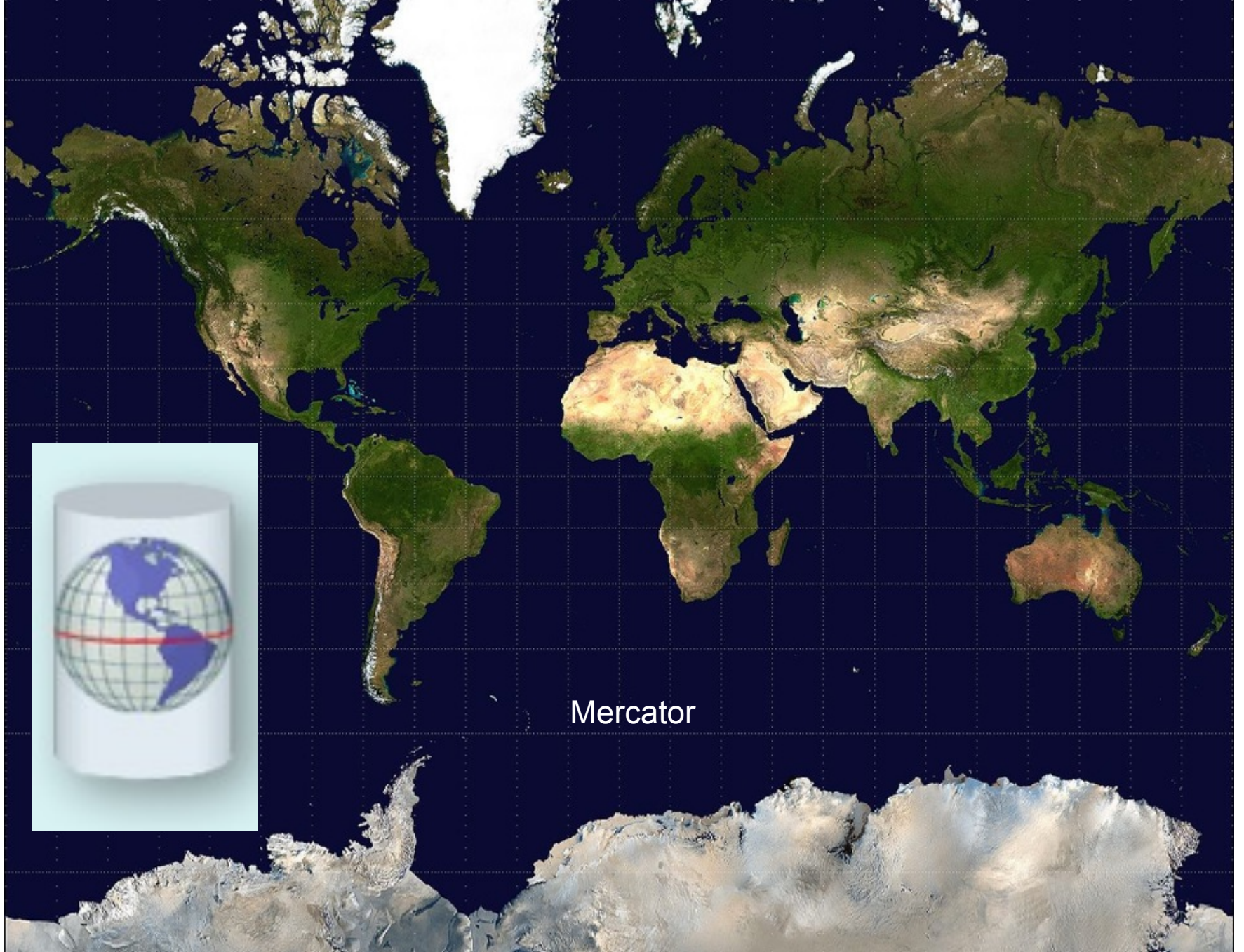
# Topography

12.001 – 31 October 2012



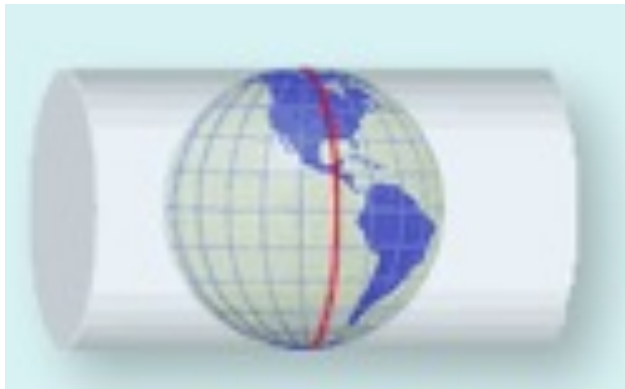
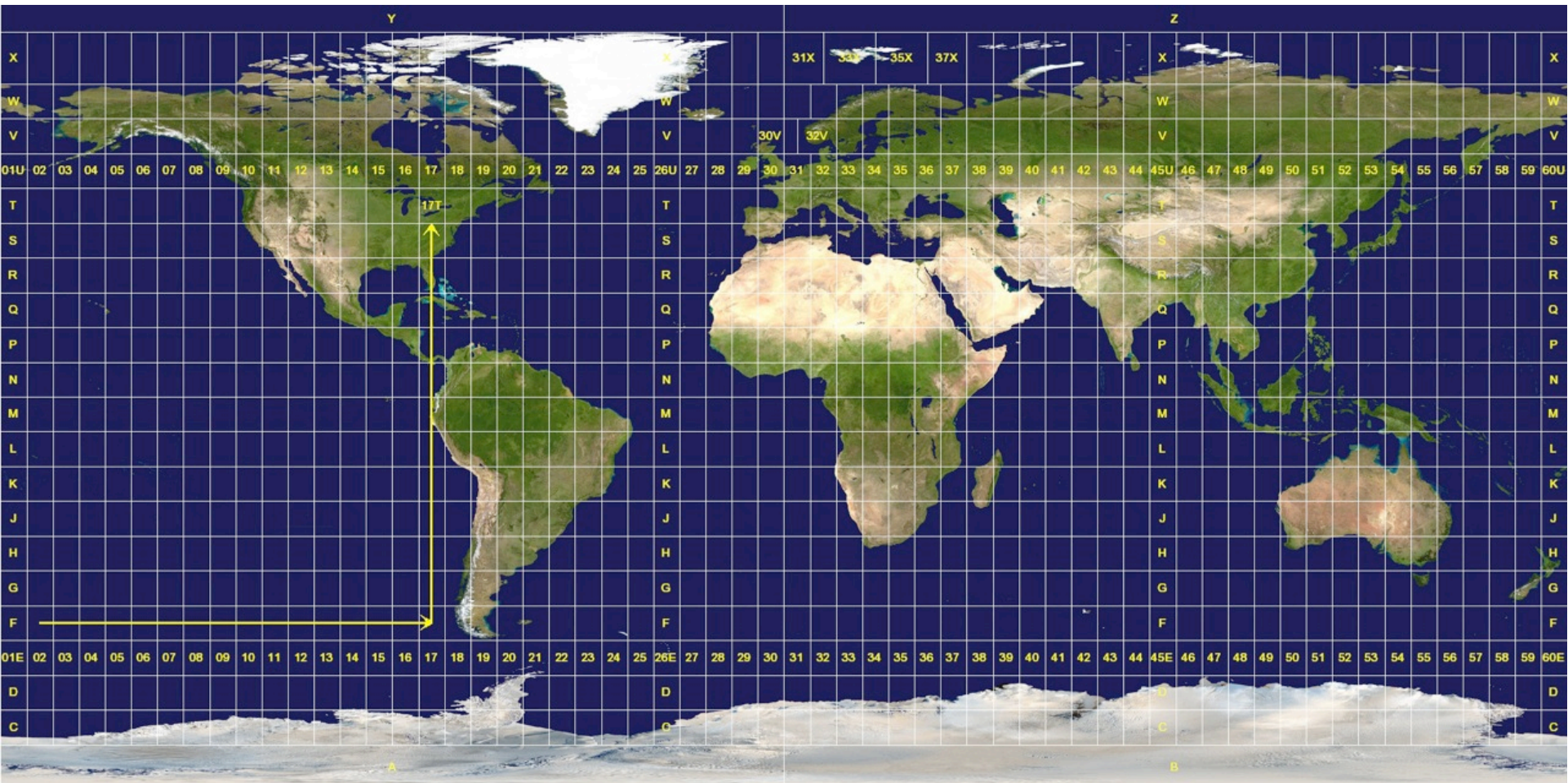
## “Geographic”/Plate carrée

Courtesy of NASA. Image in the public domain.



Mercator

Courtesy of NASA. Image in the public domain.



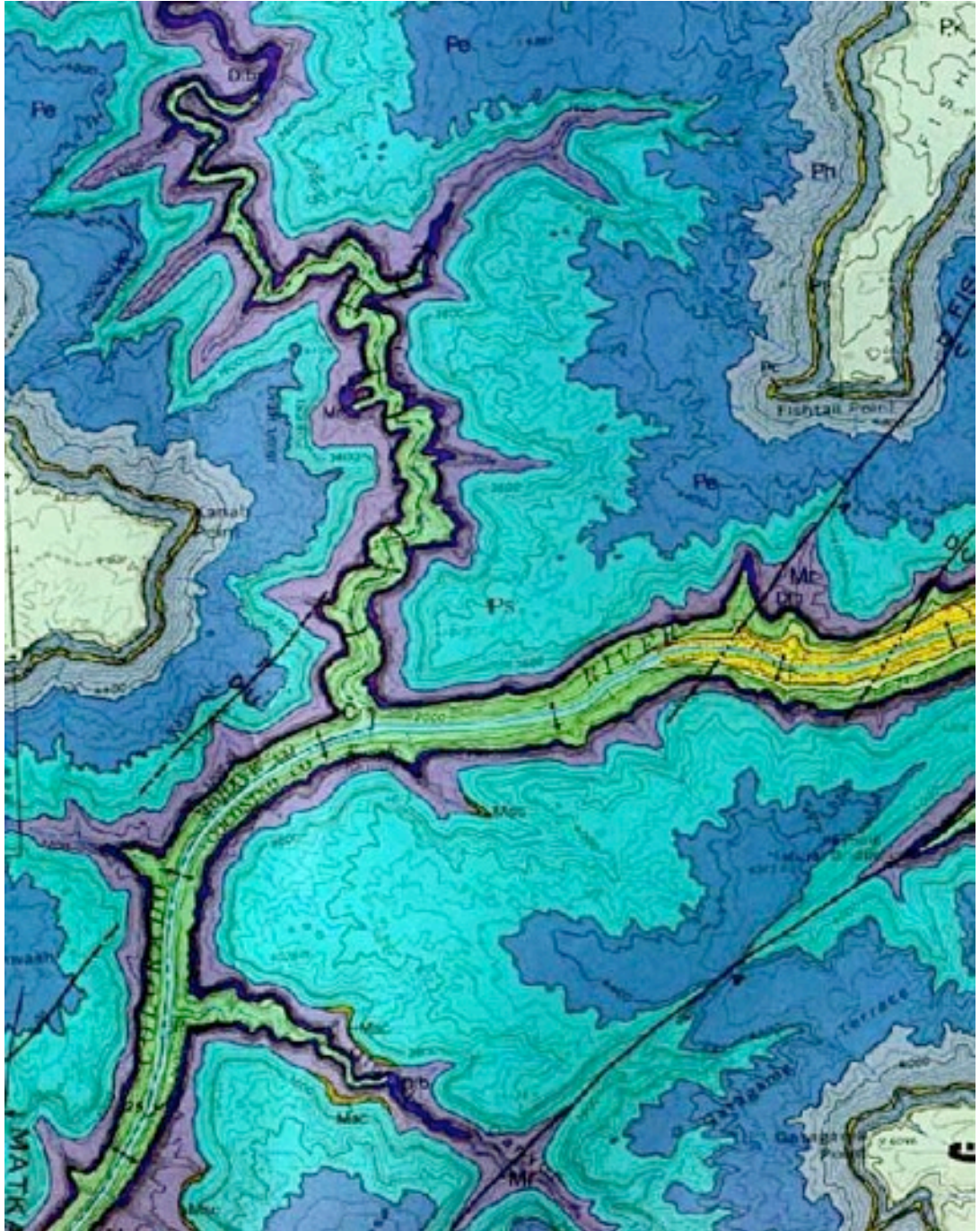
## Transverse Mercator

Courtesy of NASA. Image in the public domain.

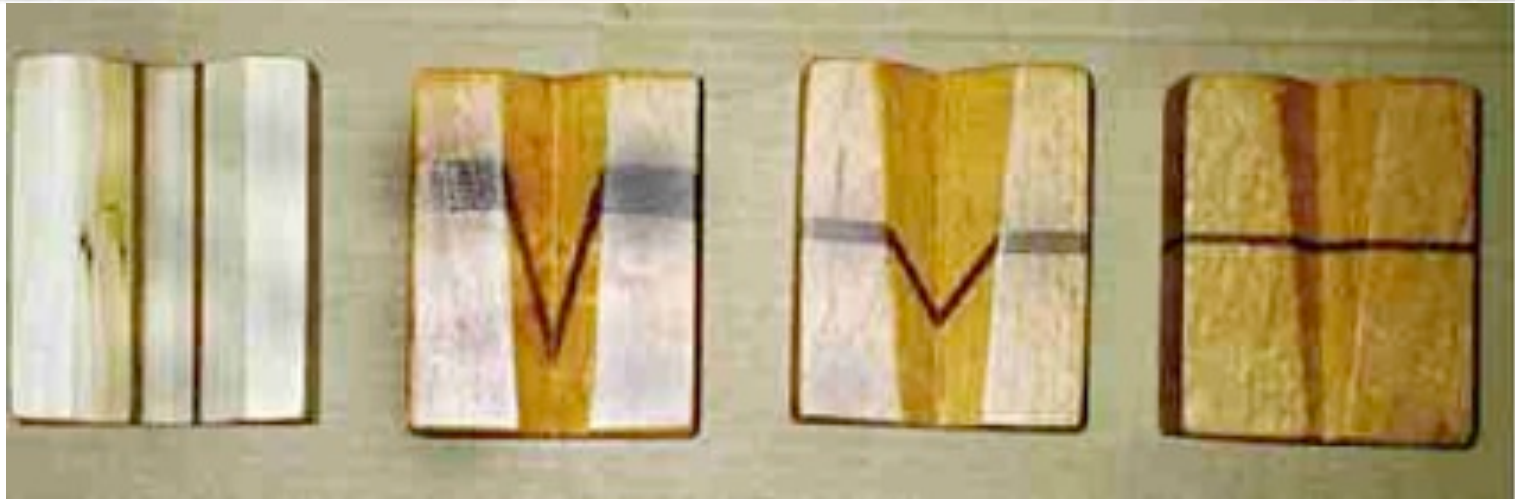
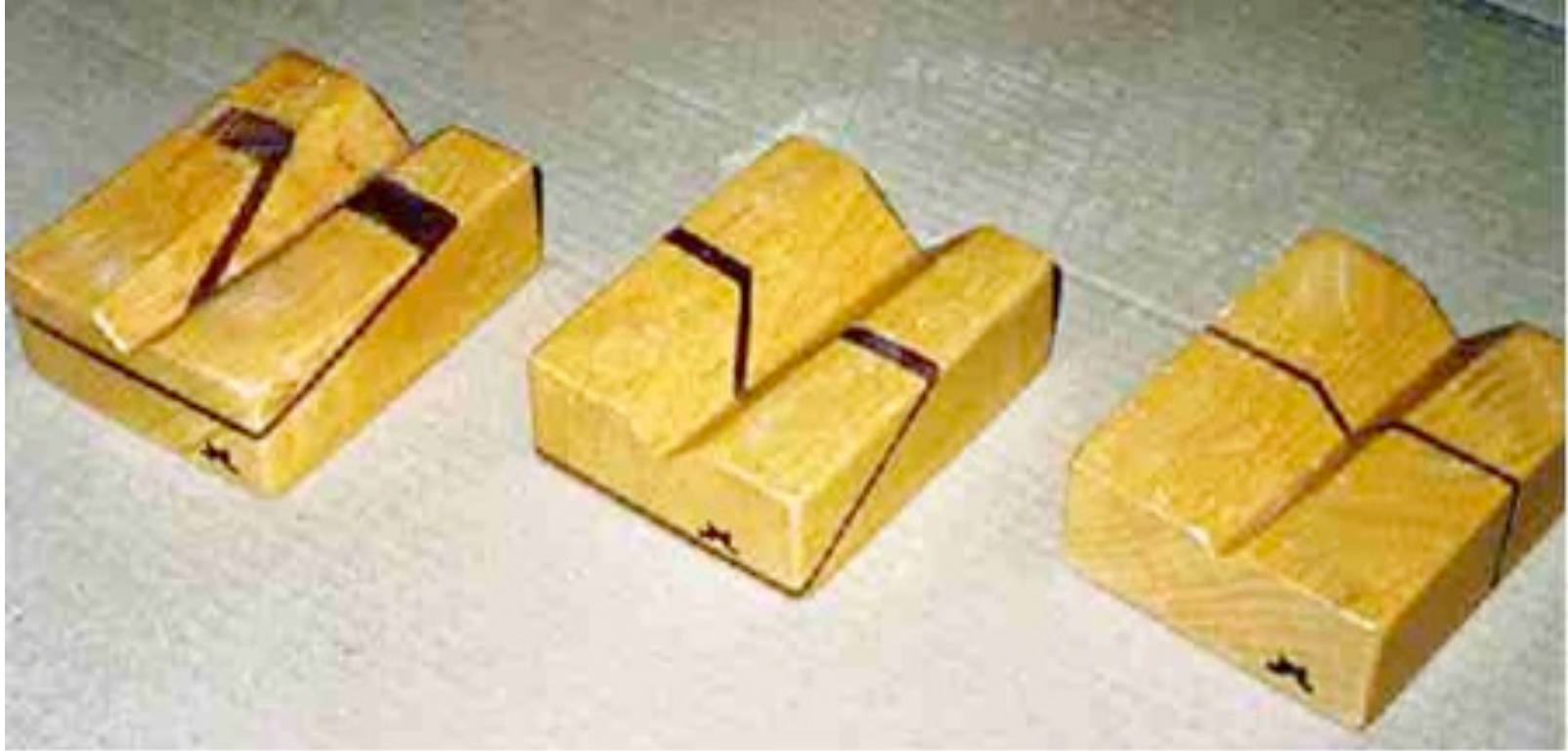


Courtesy of [scott1346](#) on Flickr. License: CC-BY.

Grand Canyon  
Marli Miller, U. Oregon



Courtesy of the U.S. Geological Survey. Map in the public domain.



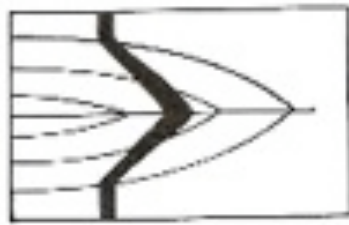
© Marli Bryant Miller. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.

Marli Miller, U. Oregon / Block Models by John Lewis, Colorado College

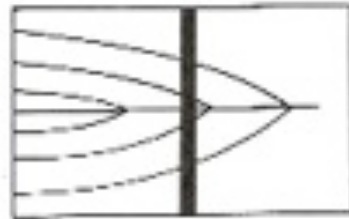


© Marli Bryant Miller. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <http://ocw.mit.edu/help/faq-fair-use/>.

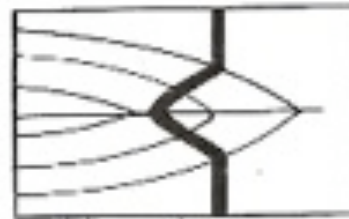
Marli Miller, U. Oregon / Block Models by John Lewis, Colorado College



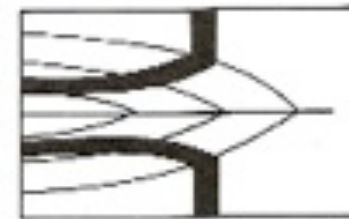
(a)



(b)



(c)



(d)



(e)

© 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/>.



# vegetation-free digital topography from laser altimetry (LiDAR)



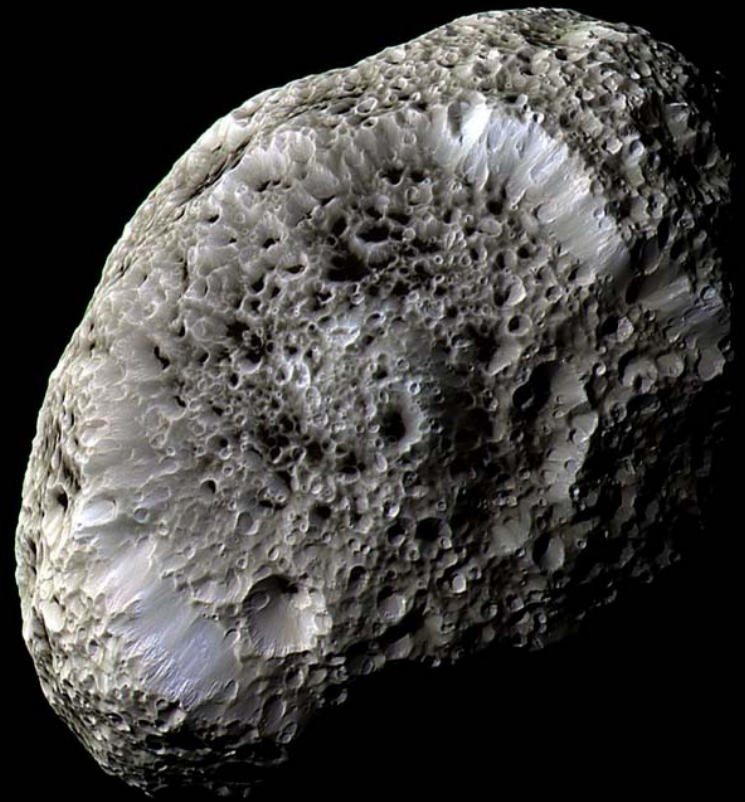
500 m

South Fork Eel River, California – 1m laser altimetry from  
National Center for Airborne Laser Mapping (NCALM)



NASA

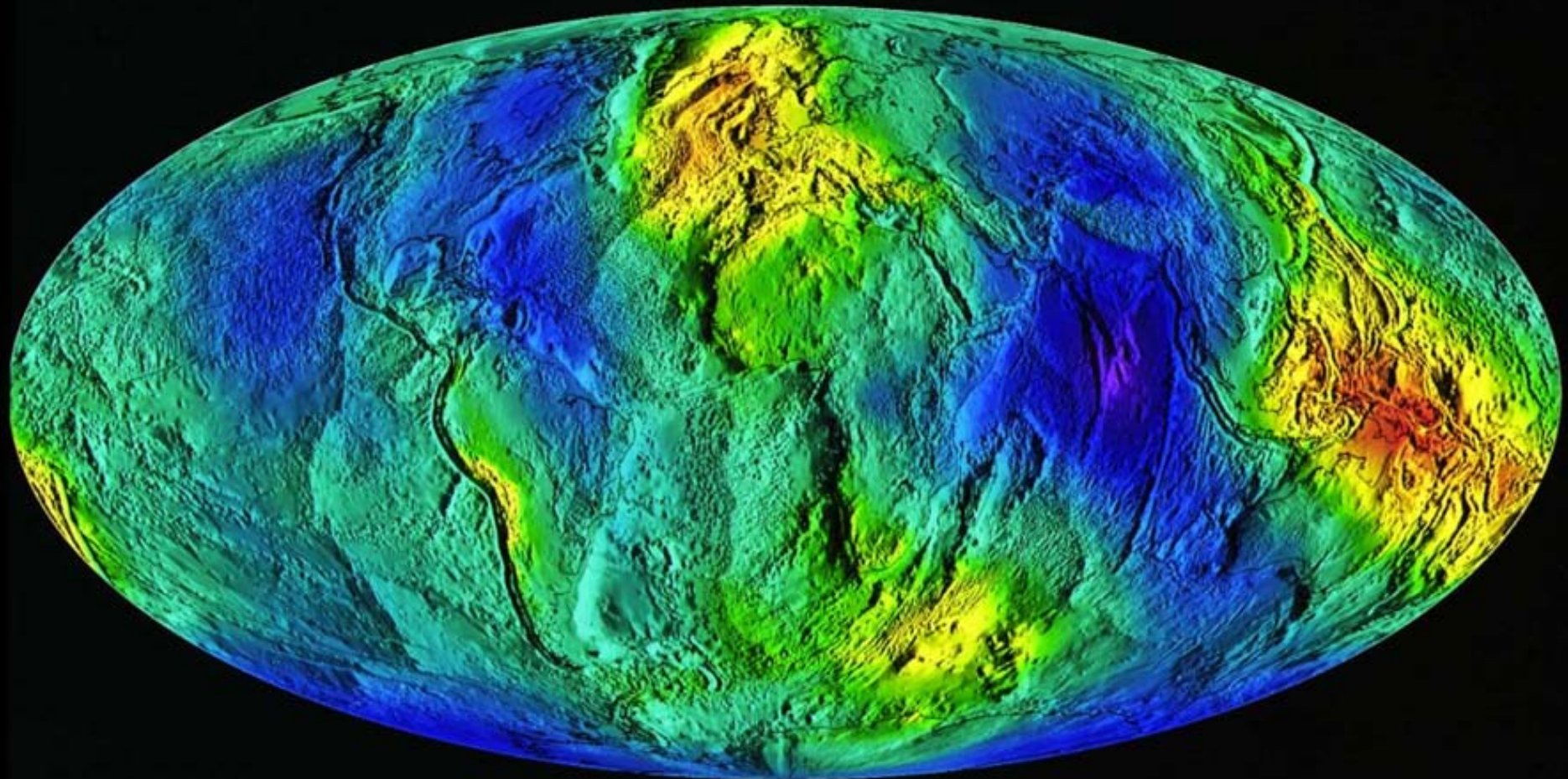
Courtesy of NASA. Image in the public domain.



Hyperion  
Cassini imaging team

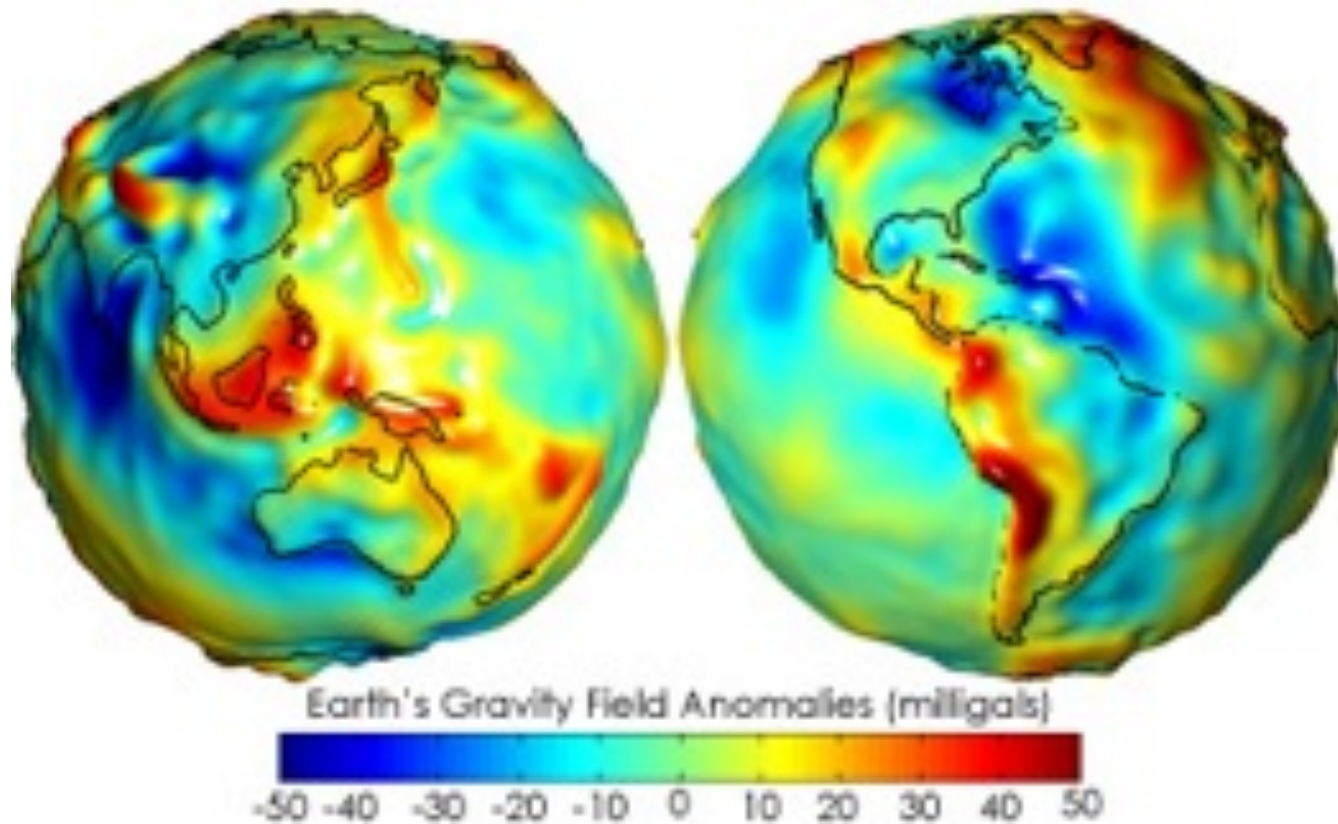
Courtesy of [NASA](#). Photograph in the public domain.

# GEOID OF THE EARTH over shaded topographic relief

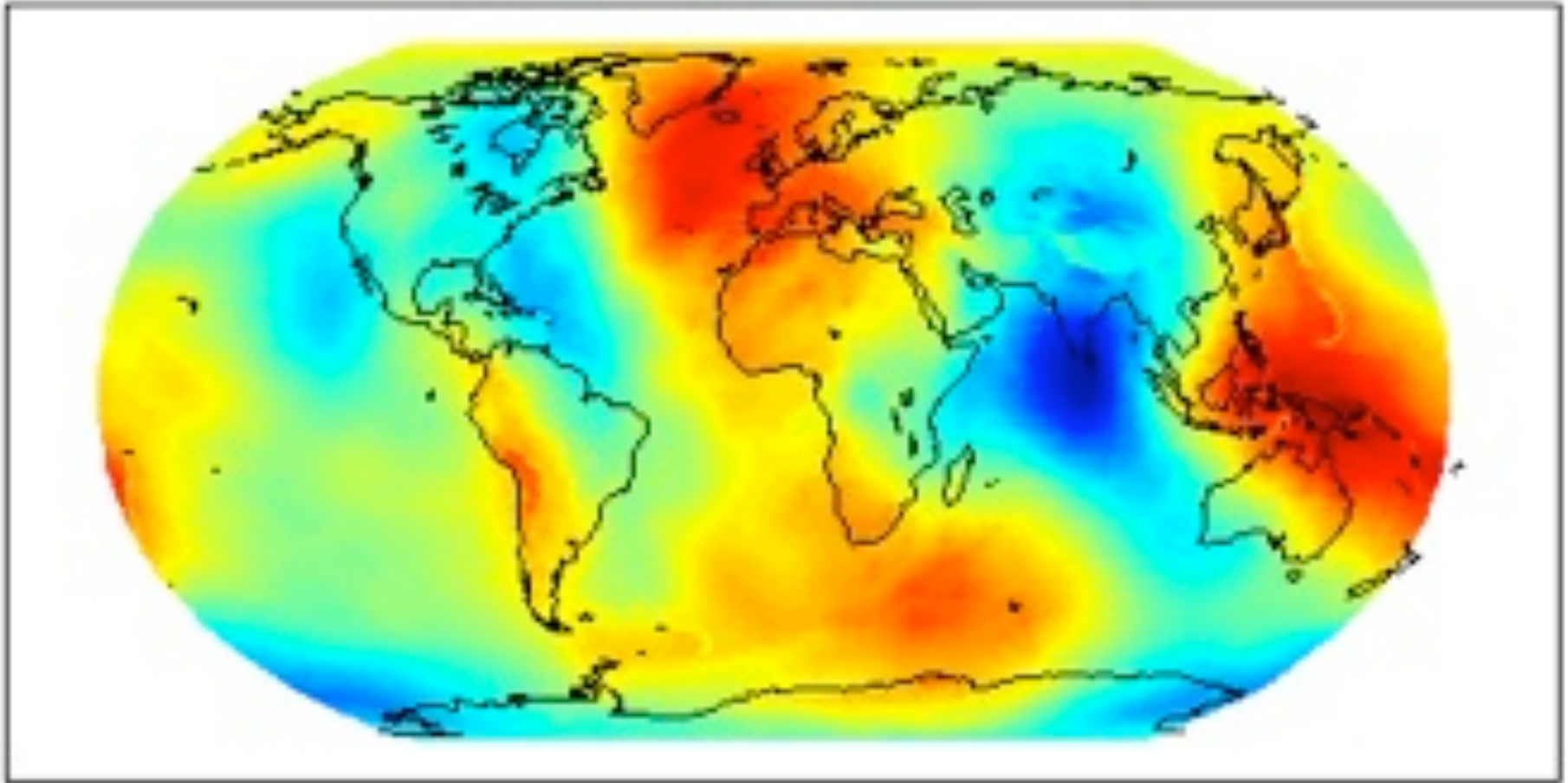


NASA

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



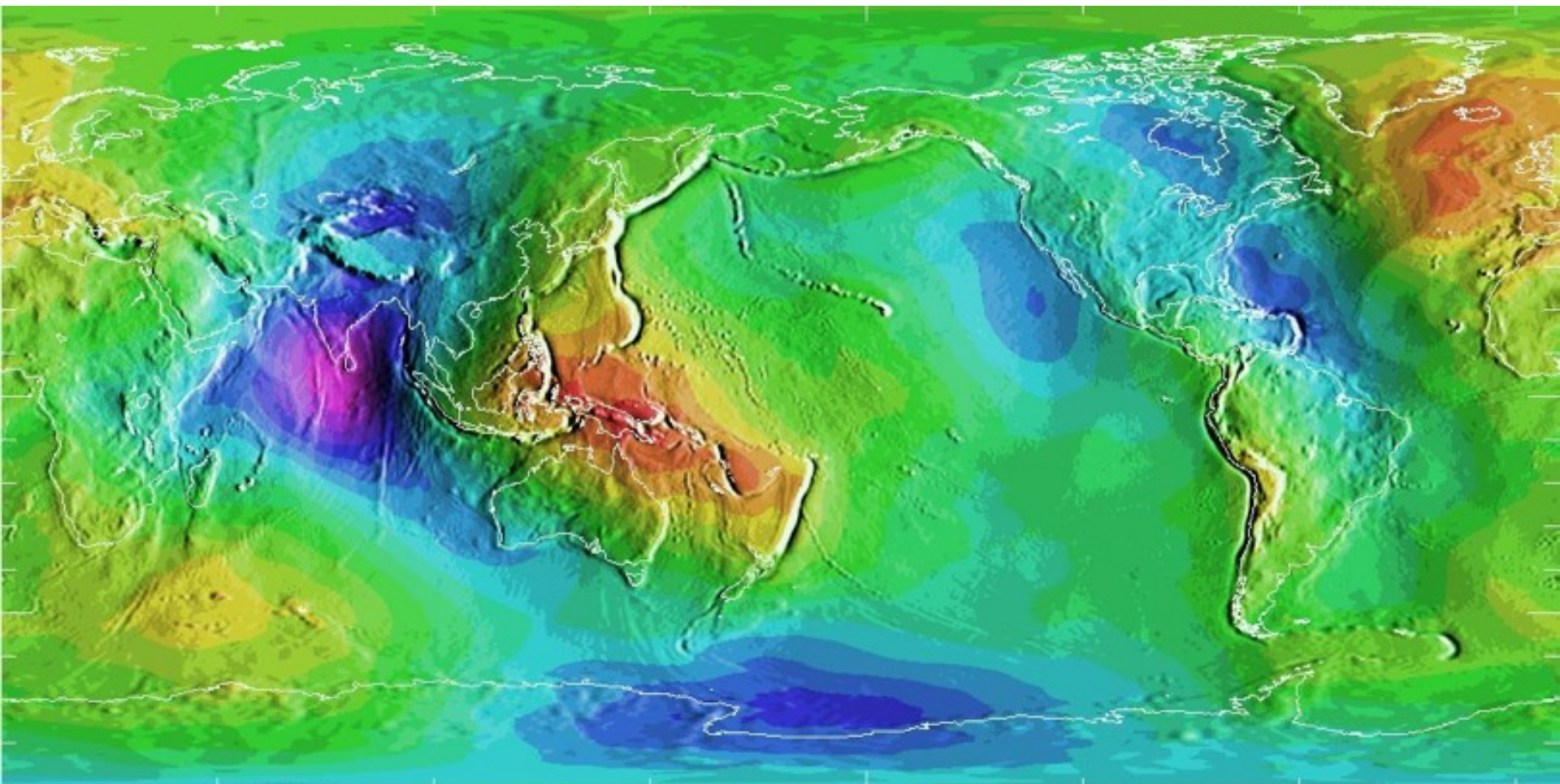
Courtesy of [NASA](#). Images in the public domain.



Mathworks

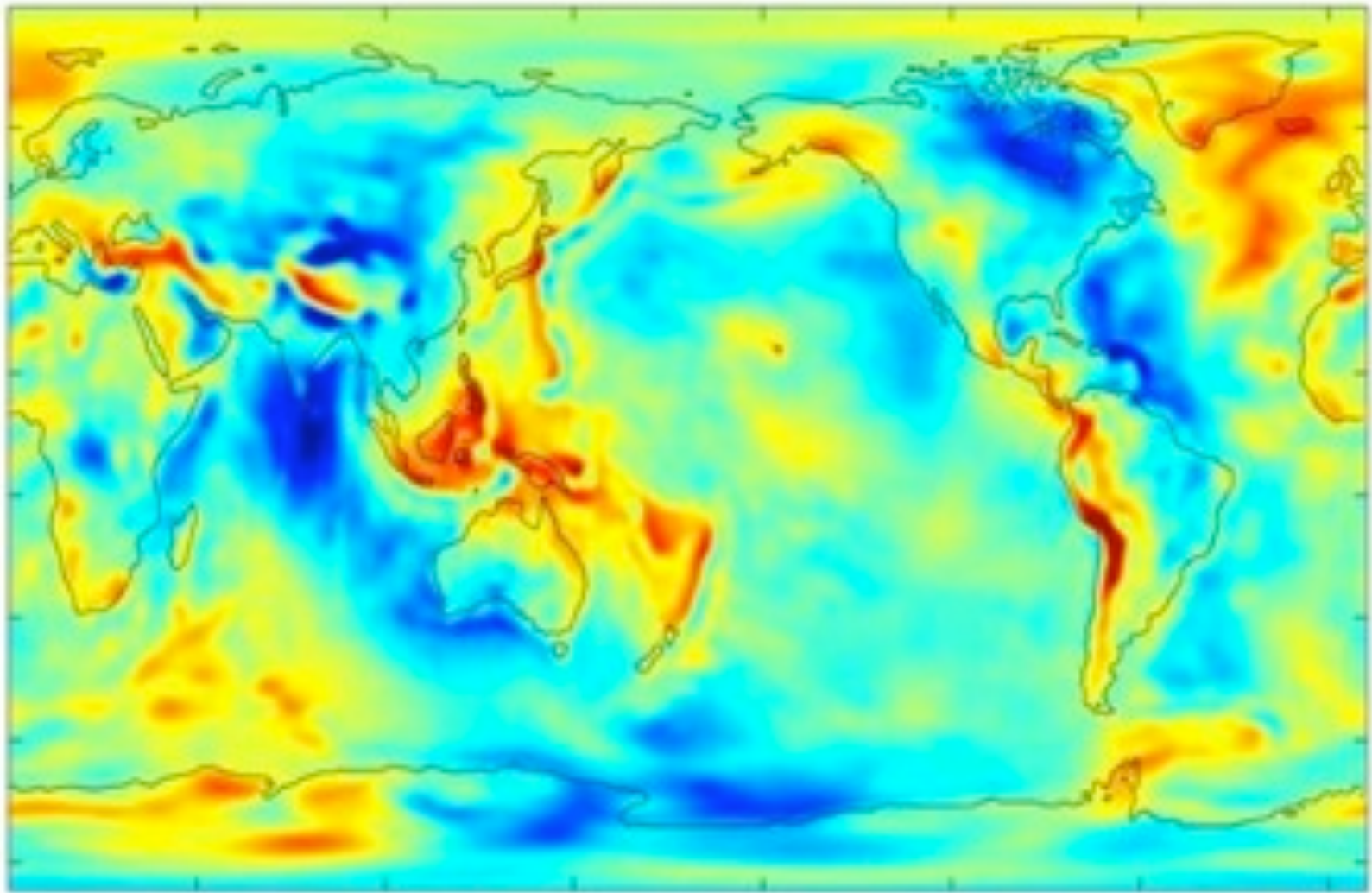
Geoid anomaly (m)

Courtesy of The MathWorks, Inc. Used with permission. MATLAB and Simulink are registered trademarks of The MathWorks, Inc. See [www.mathworks.com/trademarks](http://www.mathworks.com/trademarks) for a list of additional trademarks. Other product or brand names may be trademarks or registered trademarks of their respective holders.



Courtesy of NASA. Image in the public domain.

NIMA/NASA GSFC

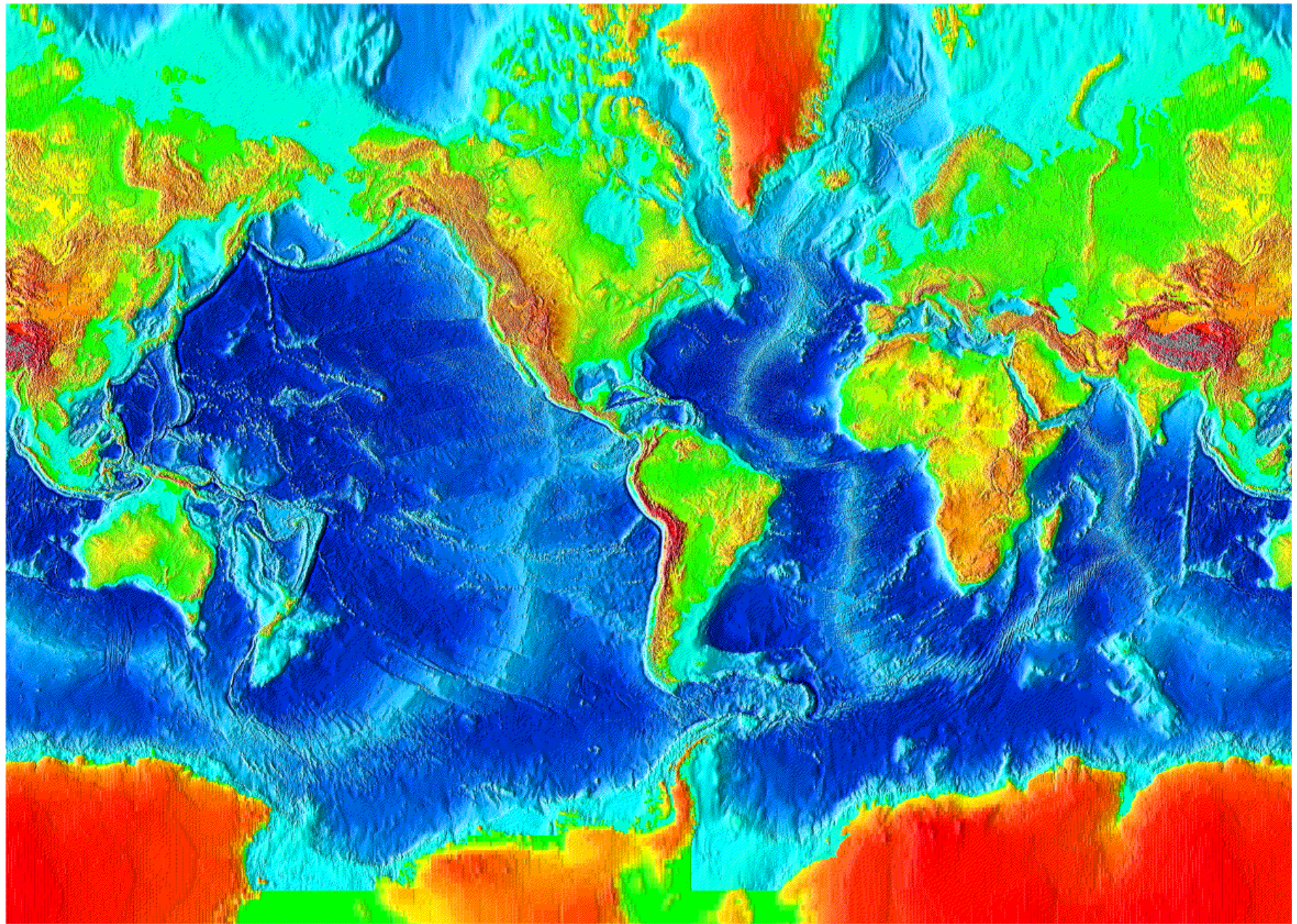


-60      -40      -20      0      20      40      60

Gravity Anomaly (mGal)

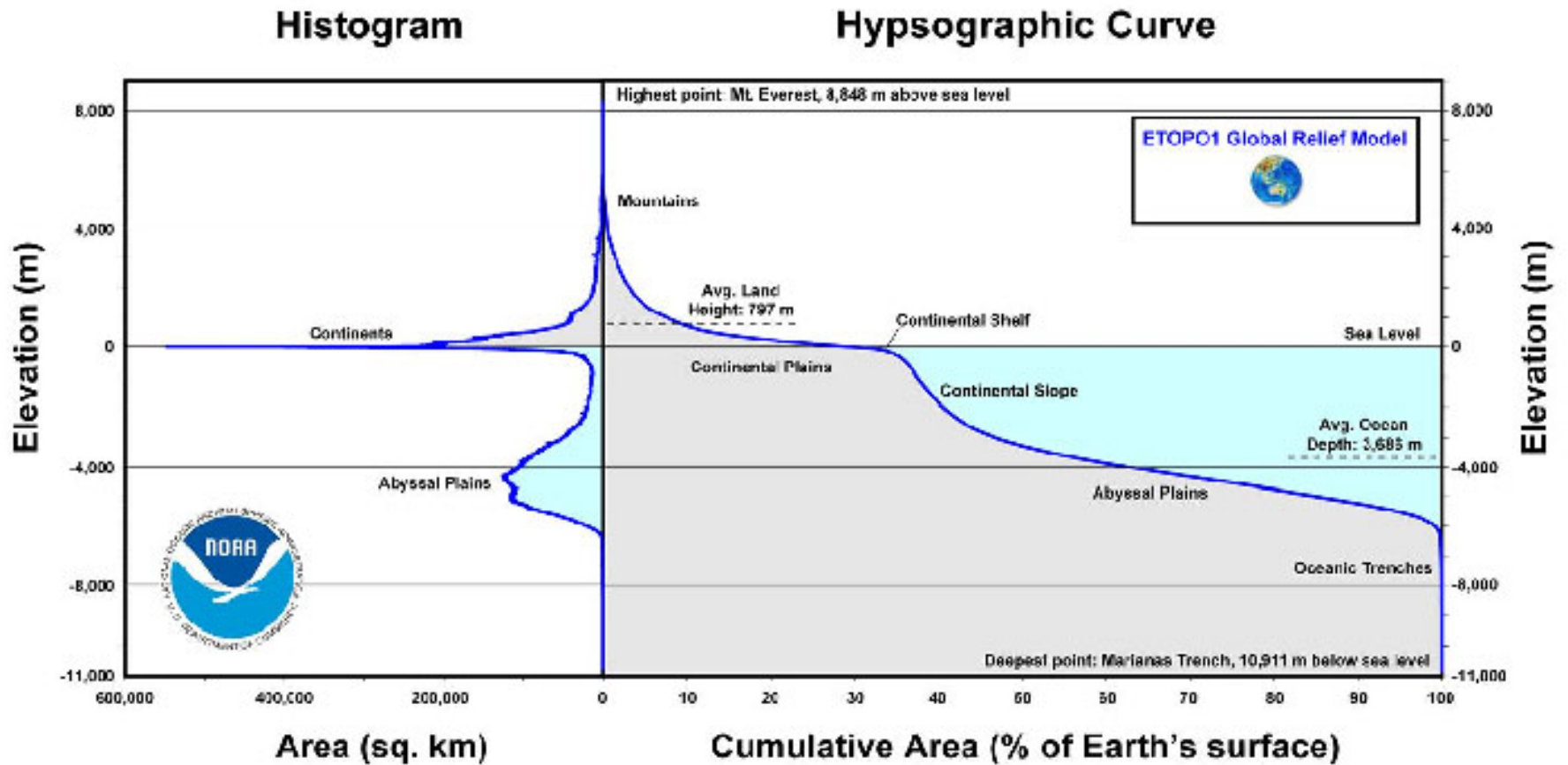
# GRACE Mission

Courtesy of NASA. Image in the public domain.



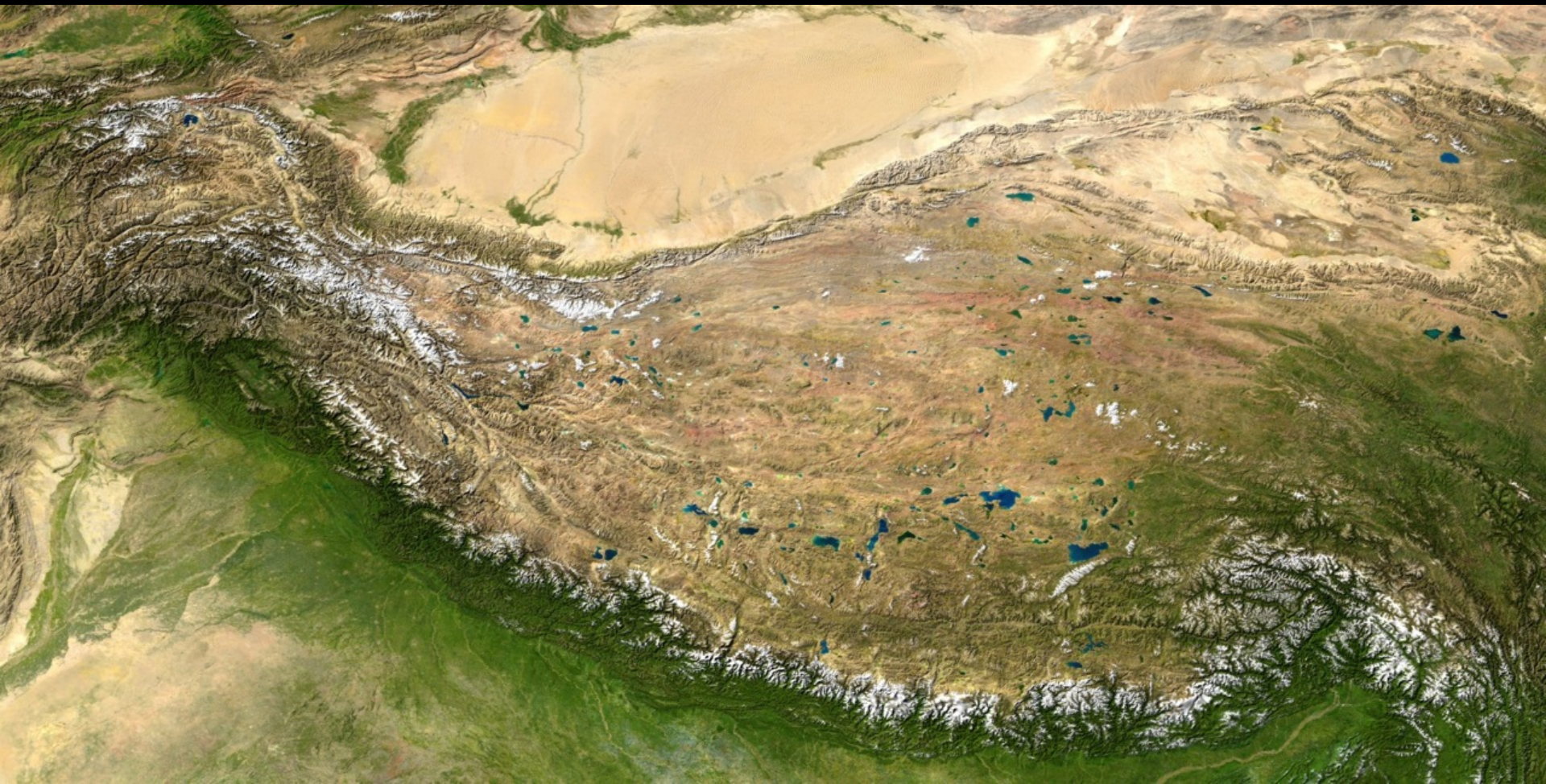
Courtesy of NOAA. Map in the public domain.





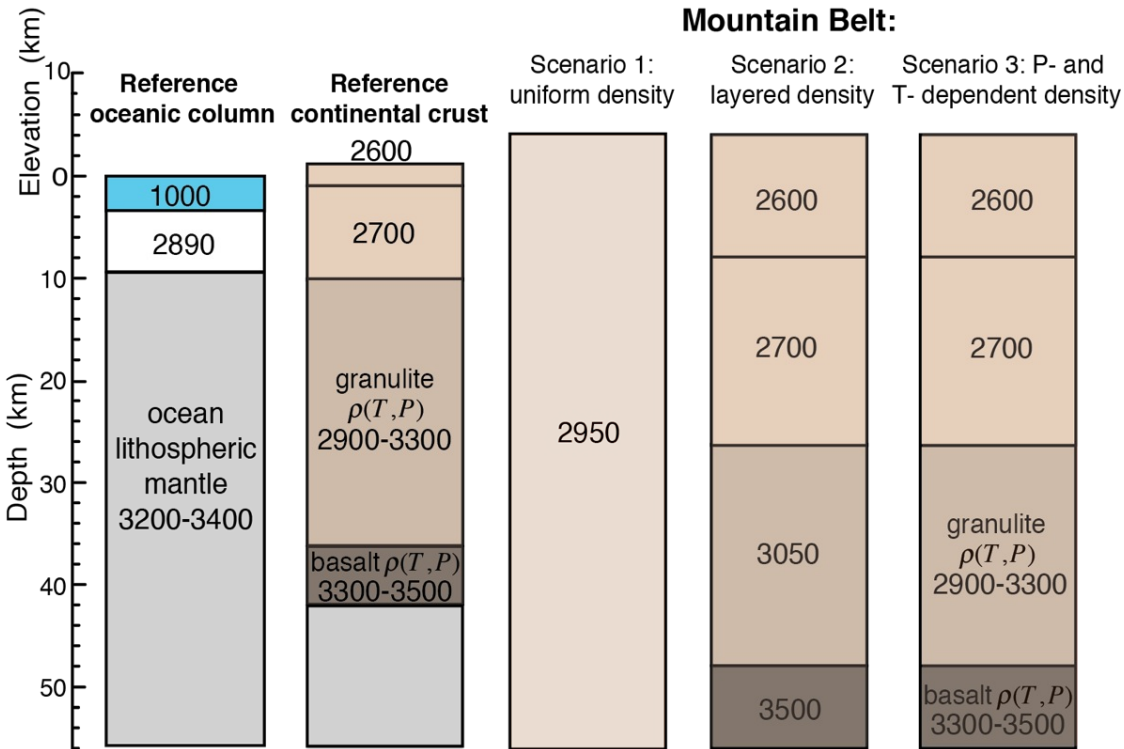
[http://www.ngdc.noaa.gov/mgg/global/etopo1\\_surface\\_histogram.html](http://www.ngdc.noaa.gov/mgg/global/etopo1_surface_histogram.html)

Courtesy of NOAA. Figure in the public domain.



NASA

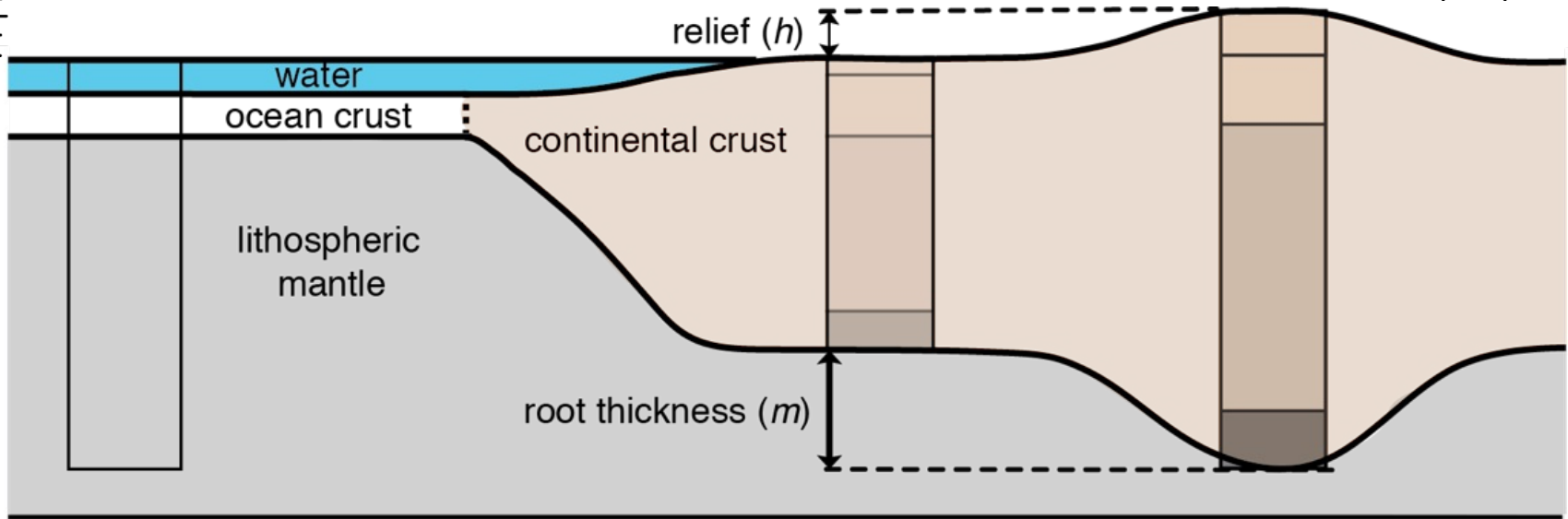
Courtesy of NASA. Photograph in the public domain.



To first order, relief should be governed by isostasy.

Model:  
 Lithosphere cools + HPE  
 Erosion rate  $\propto$  Relief  
 [e.g., Braun, several papers]  
 Isostatic equilibrium  
 3 crustal density scenarios

Blackburn et al., in prep



© 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/>.

Figures of elevation (m) and R (relief/root thickness) versus mountain belt formation age (Ma) removed due to copyright restrictions.



## Hudson Bay Paleoshorelines

Courtesy of Claude Hillaire-Marcel. Used with permission.

Claude Hillaire-Marcel, in  
Anderson & Anderson

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>.