

Glaciers

12.001 – 26 November 2012



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Glaciation changes drainage networks



Pre-ice age
drainage



W. W. Norton. After Flint, 1971

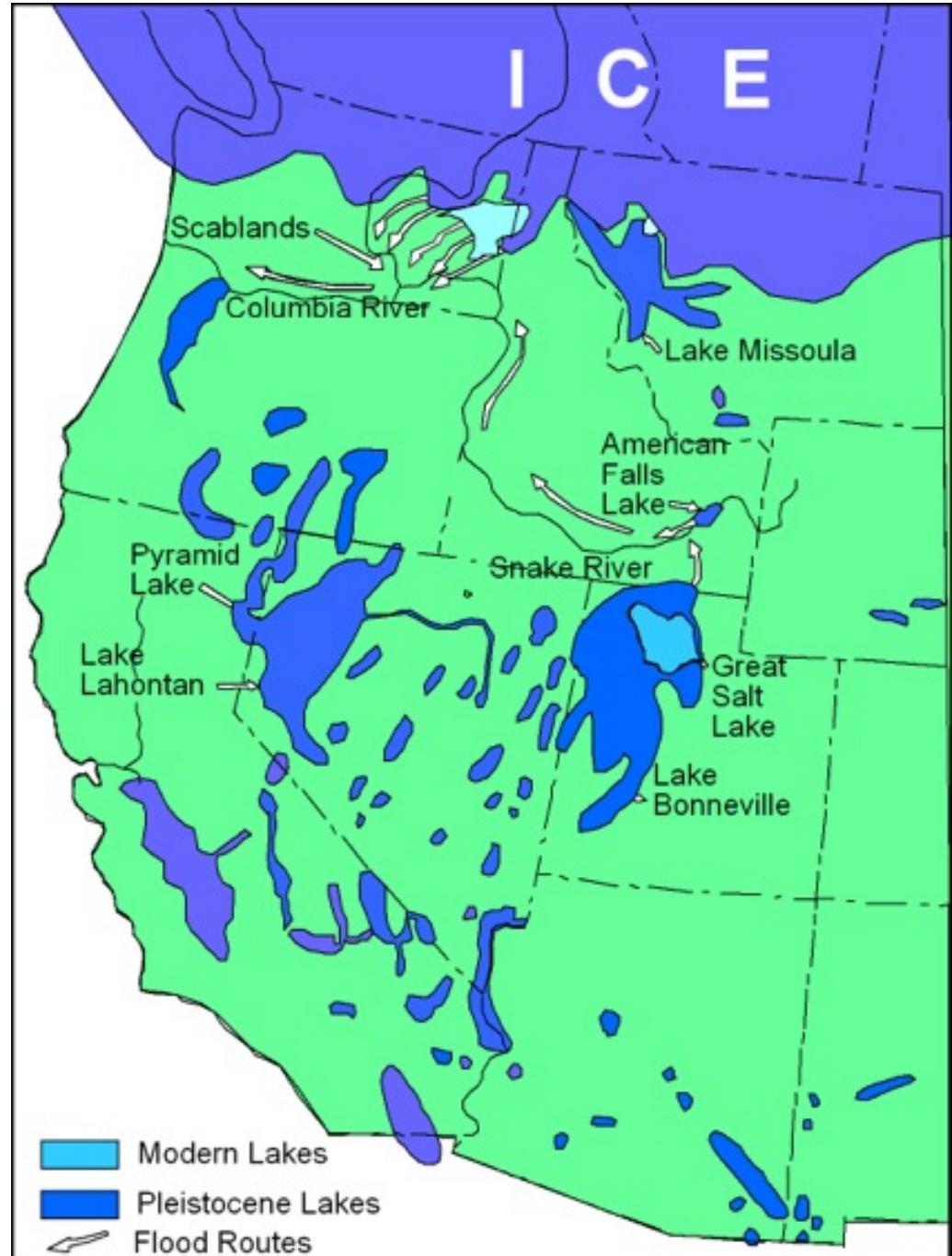
Ice spreading centers: North America



W. W. Norton. After Flint, 1971

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Pleistocene Pluvial Lakes and Megafloods





Courtesy of [LadyofHats](#) on wikipedia. Photograph in the public domain.

Megatherium (giant ground sloth)



Courtesy of [DiBgd](#) from Russian Wikipedia. Image in the public domain.

NORTEAMÉRICA HASTA HACE 10,000 AÑOS

Sergio de la Rosa Martínez



Cirque glacier



J. Alean

Courtesy of Jürg Alean, from swisseduc.ch Glaciers online website. Used with permission.

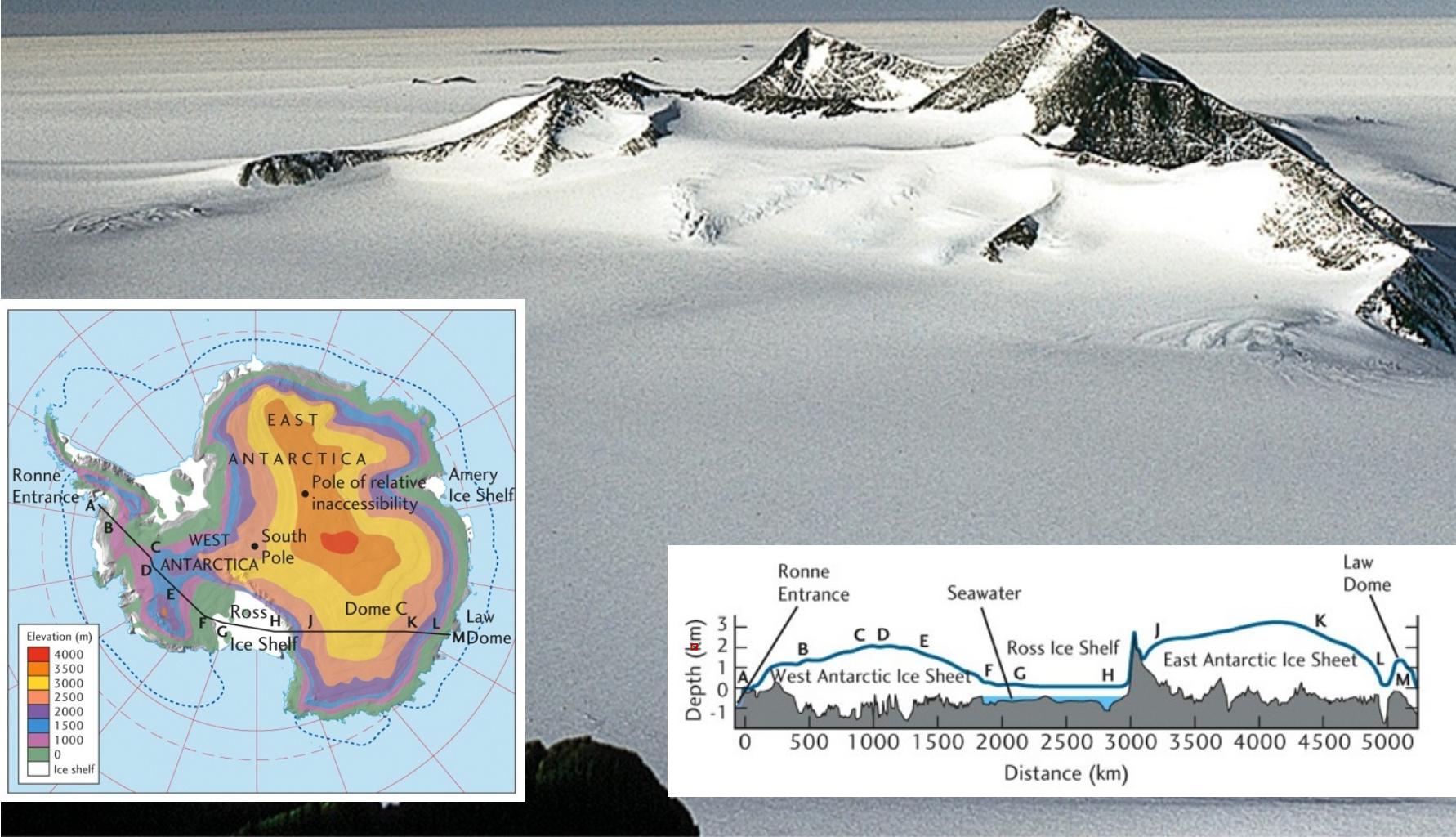
Valley glacier



Franz Josef Glacier, NZ

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

East Antarctic Ice Sheet



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

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



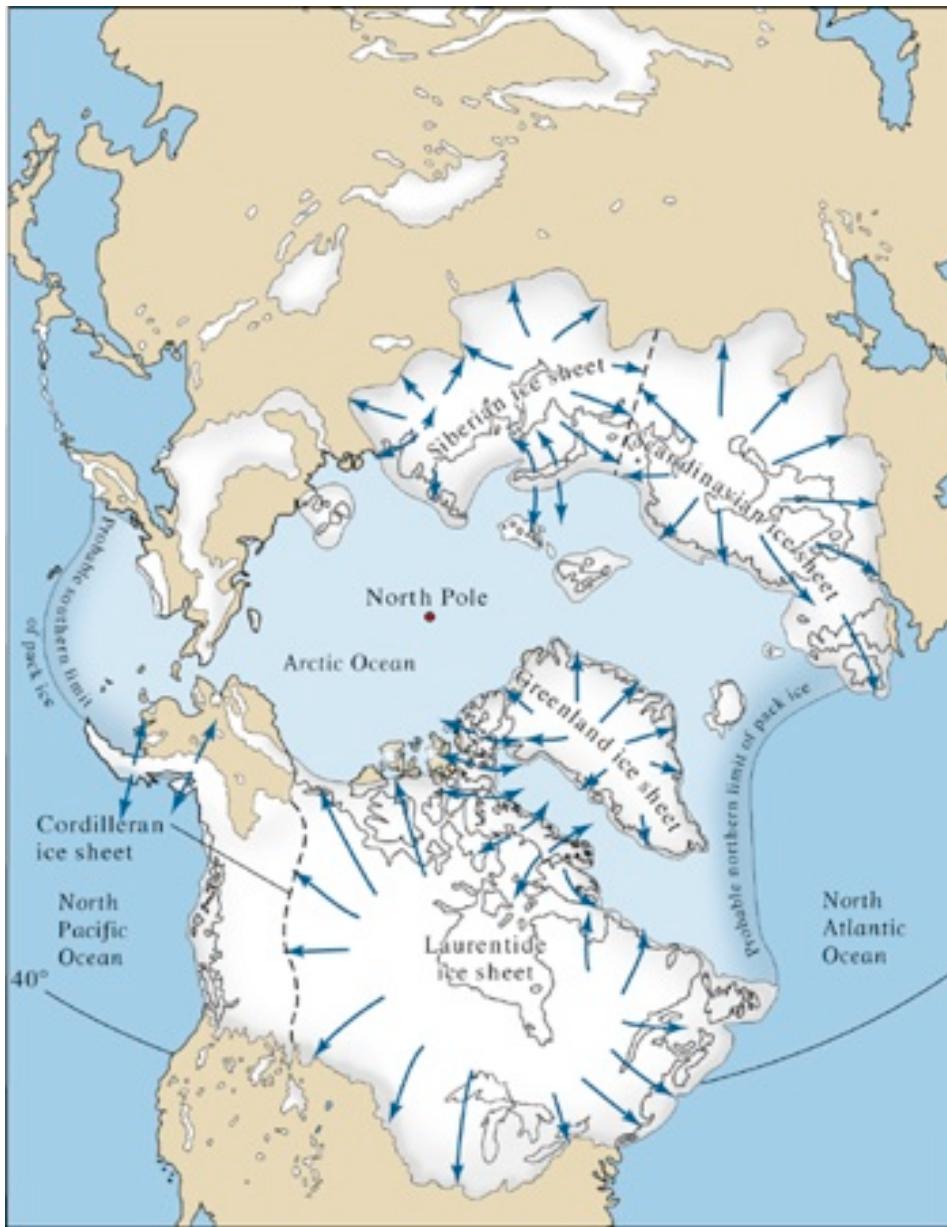
Franz Josef Glacier, NZ

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

Measured glacier velocities

Site	Surface velocity (m/yr)
S. Cascades	20
Antarctica	32
Greenland	50
Alps	100
Saskatchewan, Canadian Rockies	120
SE Alaska	500
Ansterdalsbreen, Norway (icefall)	2000

Ice spreading centers: North America



W. W. Norton. After Flint, 1971

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Photography by M. J. Hambrey, www.glaciers-online.net. Used with permission.

Fox Glacier, NZ (M J Hambrey)



Uspallata Valley

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Eyjafjörður

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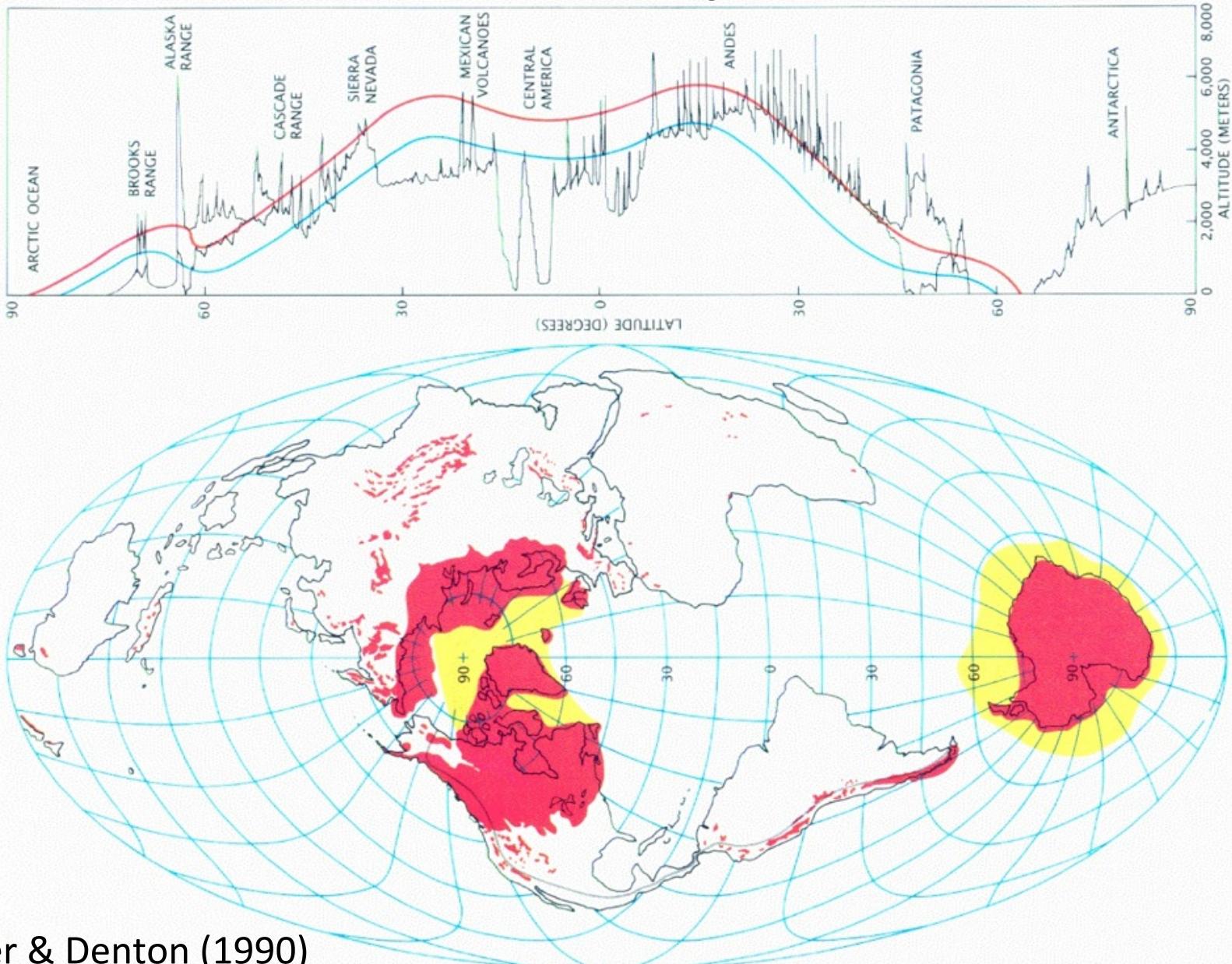
Glen Coe
(Lindy Elkins-Tanton)

Courtesy of Lindy Elkins-Tanton. Used with permission.

Valle de Ordesa



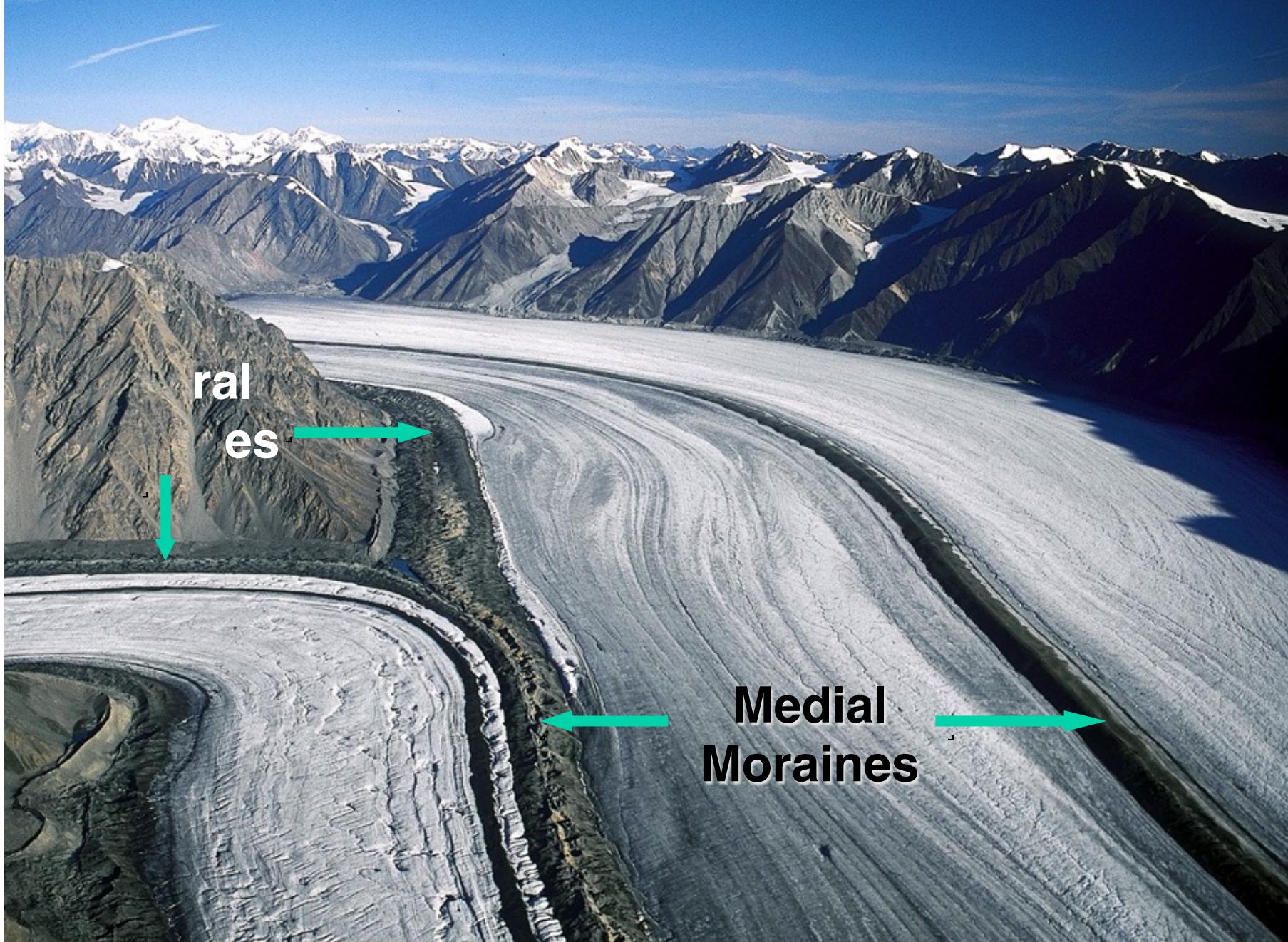
“Glacial buzzsaw” hypothesis



Broecker & Denton (1990)

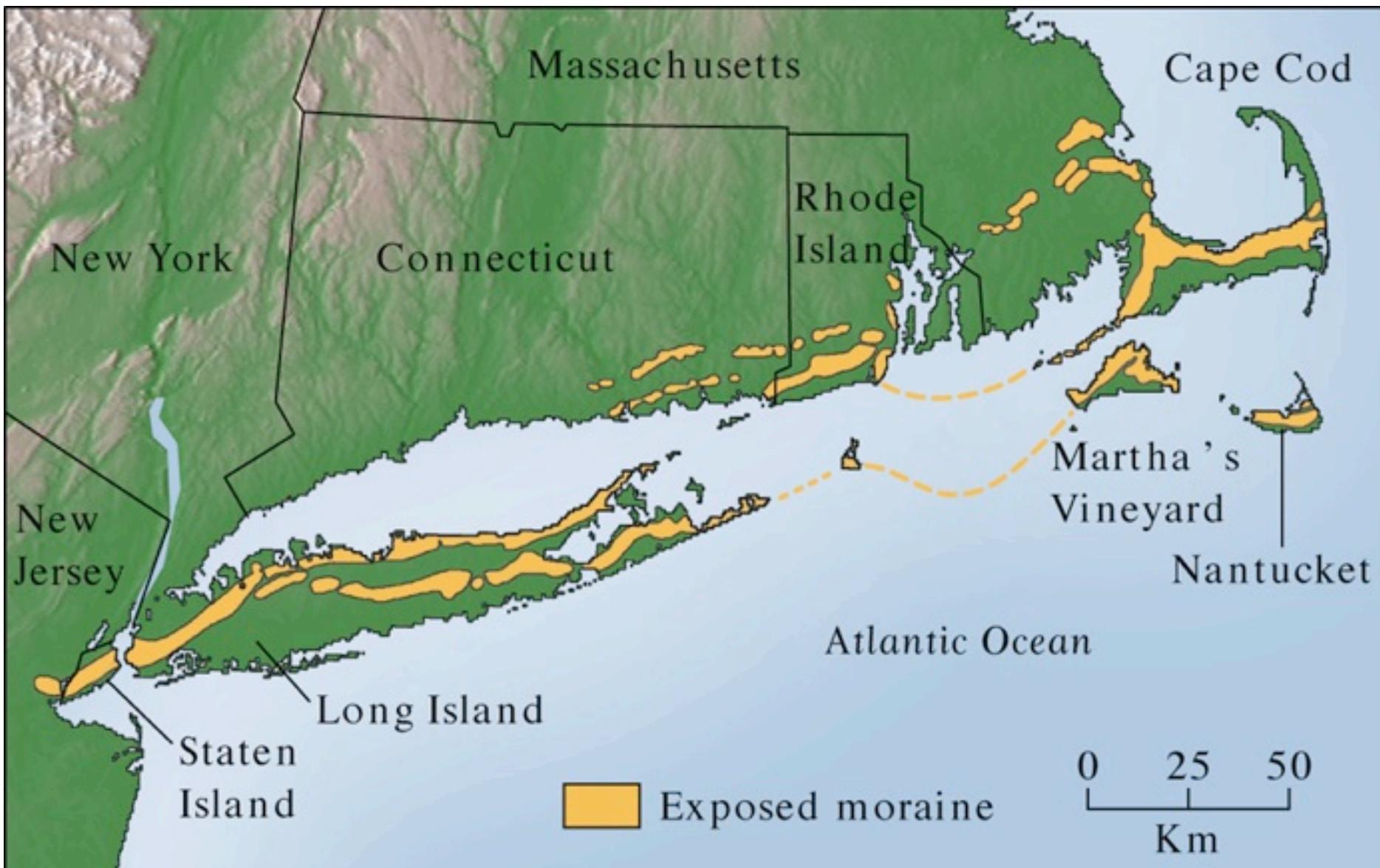
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Source: Broecker, Wallace S., and George H. Denton. "What Drives Glacial Cycles?." *Scientific American* 262, no. 1 (1990): 42-50.



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Terminal moraines in the eastern U.S.



W. W. Norton. Adapted from Tarbuck and Lutgens, 1996

Drumlins

Photograph of farm country with drumlins, Dodge County, Wisconsin removed due to copyright restrictions. View [the photograph here](#).

Kame Hill

geology.wisc.edu



Kettle Lakes, Siberia

Landsat 7 image

Courtesy of USGS & NASA. Image in the public domain.

Kettle Lakes near Mt. Cook, NZ



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Esker in NW Territory, Canada



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Striations



Stephen Marshak

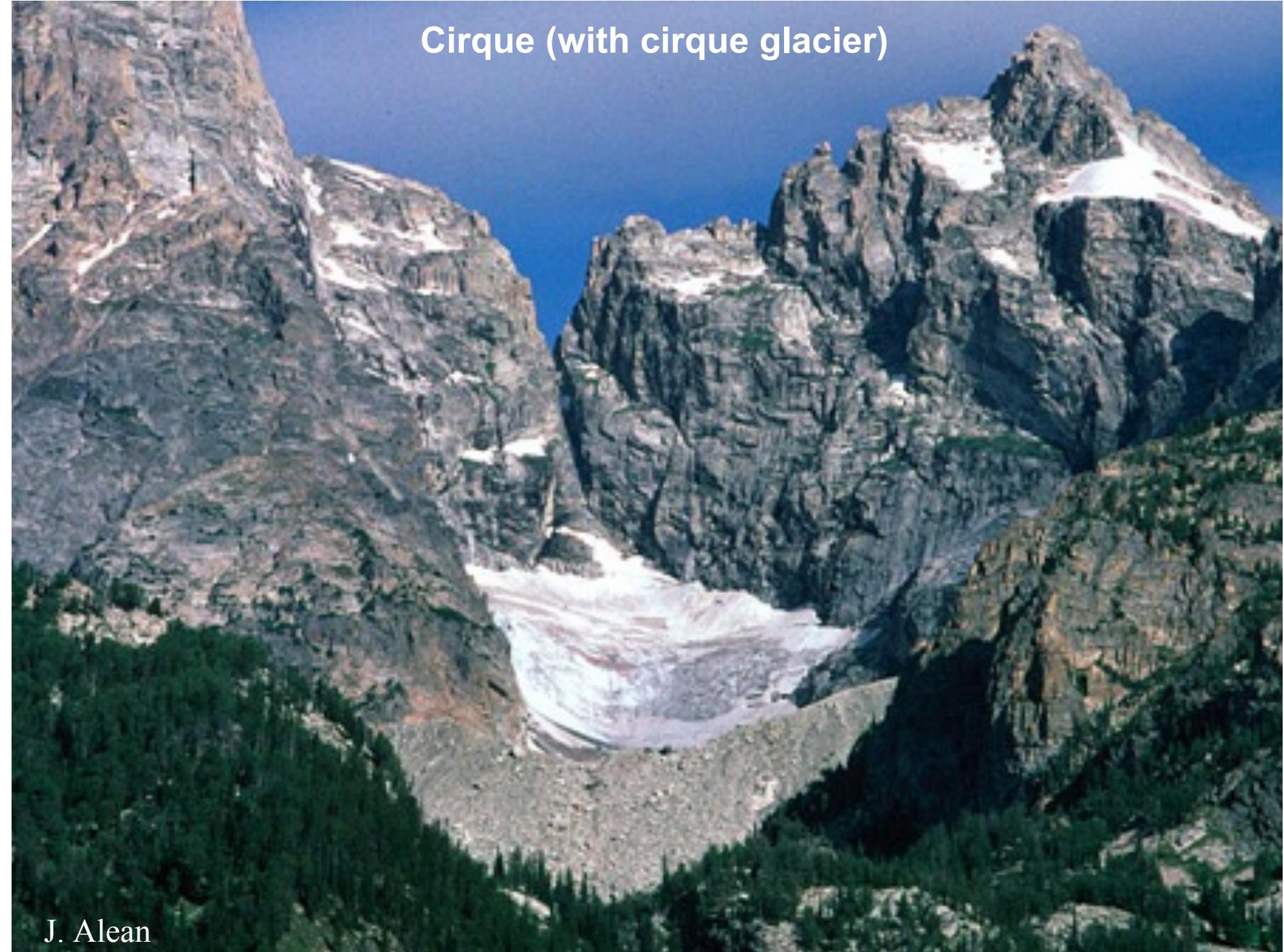
Steve Marshak

Striations & “chatter marks”



Steve Marshak

Cirque (with cirque glacier)



J. Alean

Courtesy of Jürg Alean, from swisseduc.ch Glaciers online website. Used with permission.

Roche moutonnée



Martin G. Miller

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12.001 Introduction to Geology

Fall 2013

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