



ESTACIÓN
PATAGONIA
UC



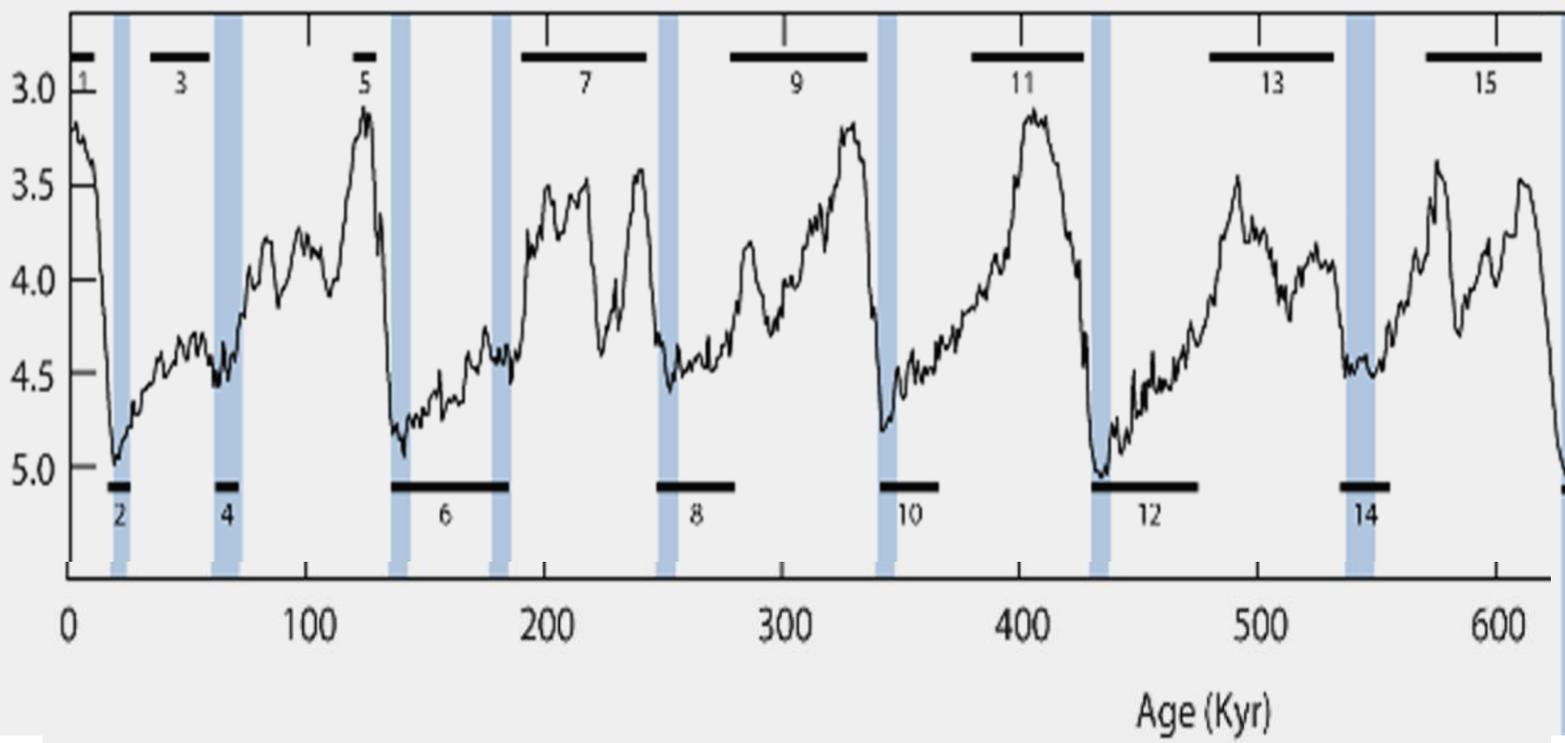
GLACIER IN CRISIS:

*How responsive are Patagonian glaciers
to extreme warm periods?*

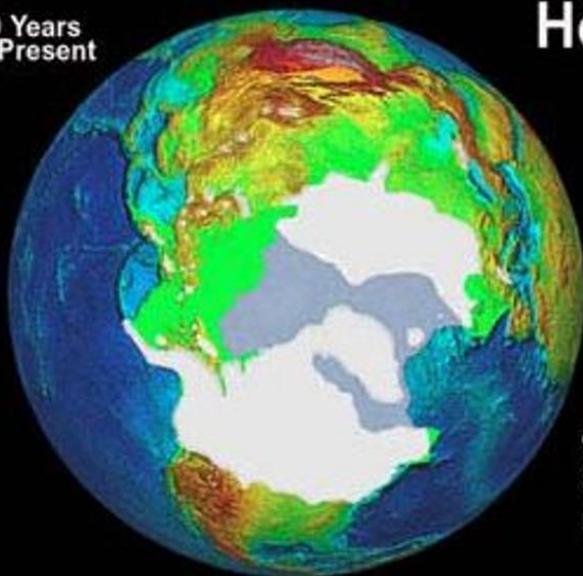
Esteban A. Sagredo (esagredo@uc.cl)

Foraminíferos béticos

$\delta^{18}\text{O}$ (‰)
(Lisicki & Raymo, 2005)



18,000 Years
Before Present



Northern Hemisphere

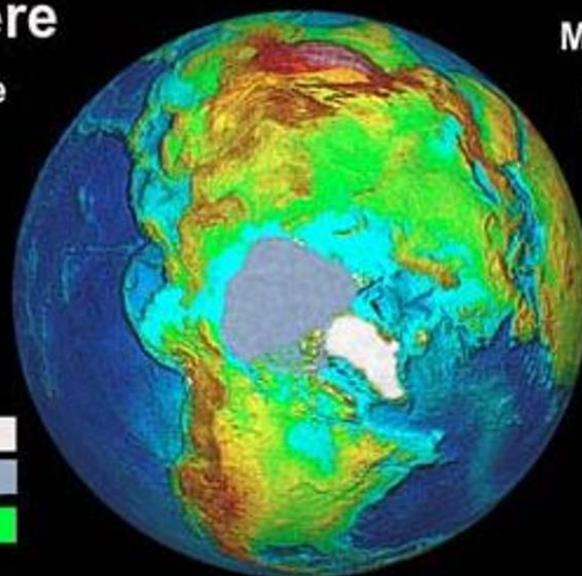
Ice Coverage

Legend



Modern Day

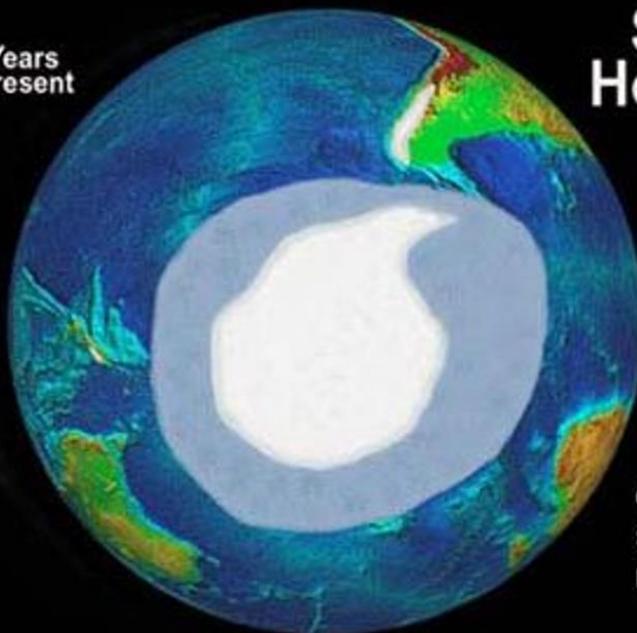
(August)



Note: Modern sea ice coverage represents summer months.



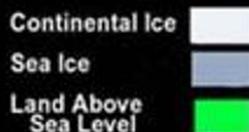
18,000 Years
Before Present



Southern Hemisphere

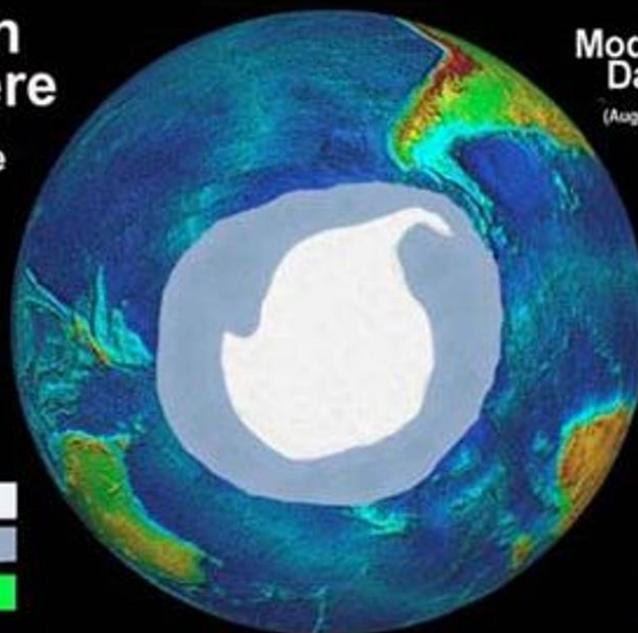
Ice Coverage

Legend

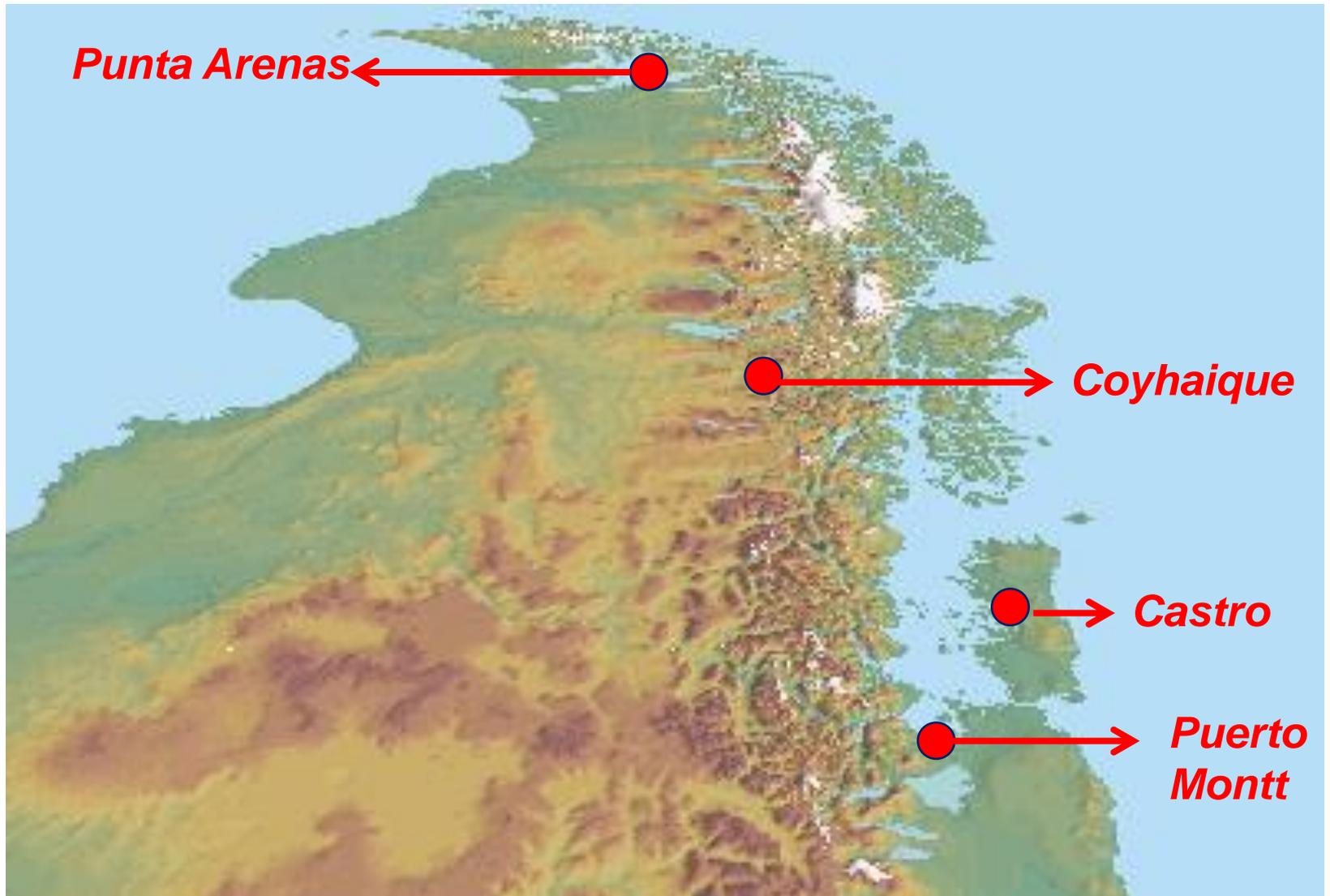


Modern Day

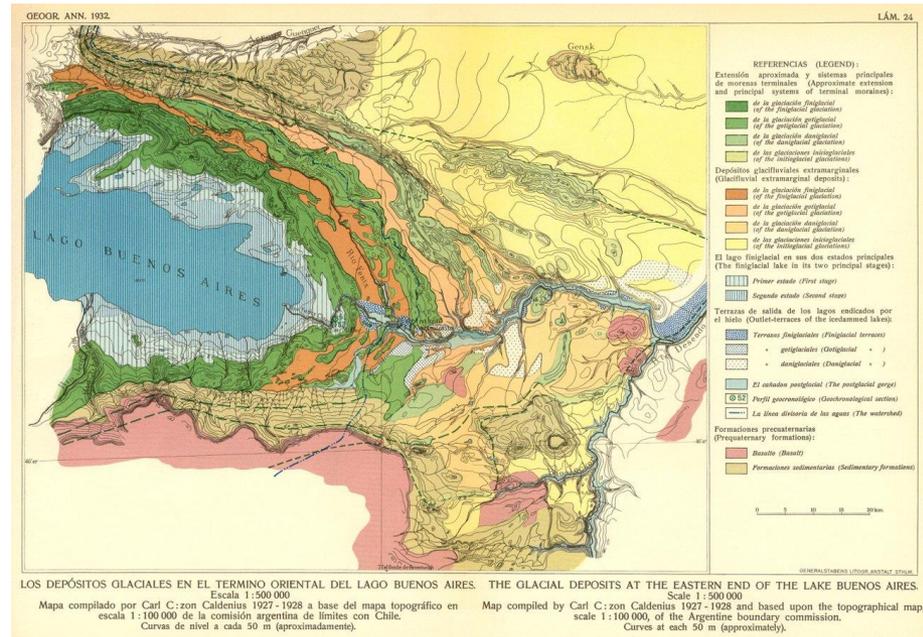
(August)







Modelo: Alexander Brenning, Friedrich Schiller University



Las Glaciaciones Cuaternarias en la Patagonia y Tierra del Fuego

Carl C:zon Caldenius

Geografiska Annaler, Volume 14 (1932), 1-164.



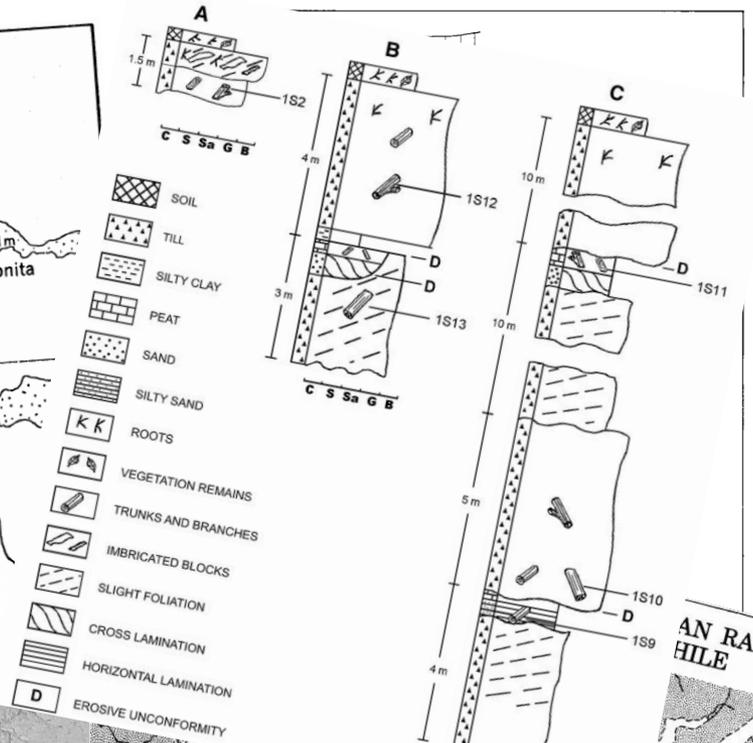
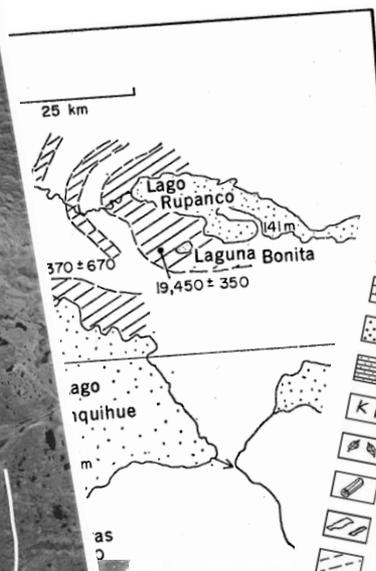
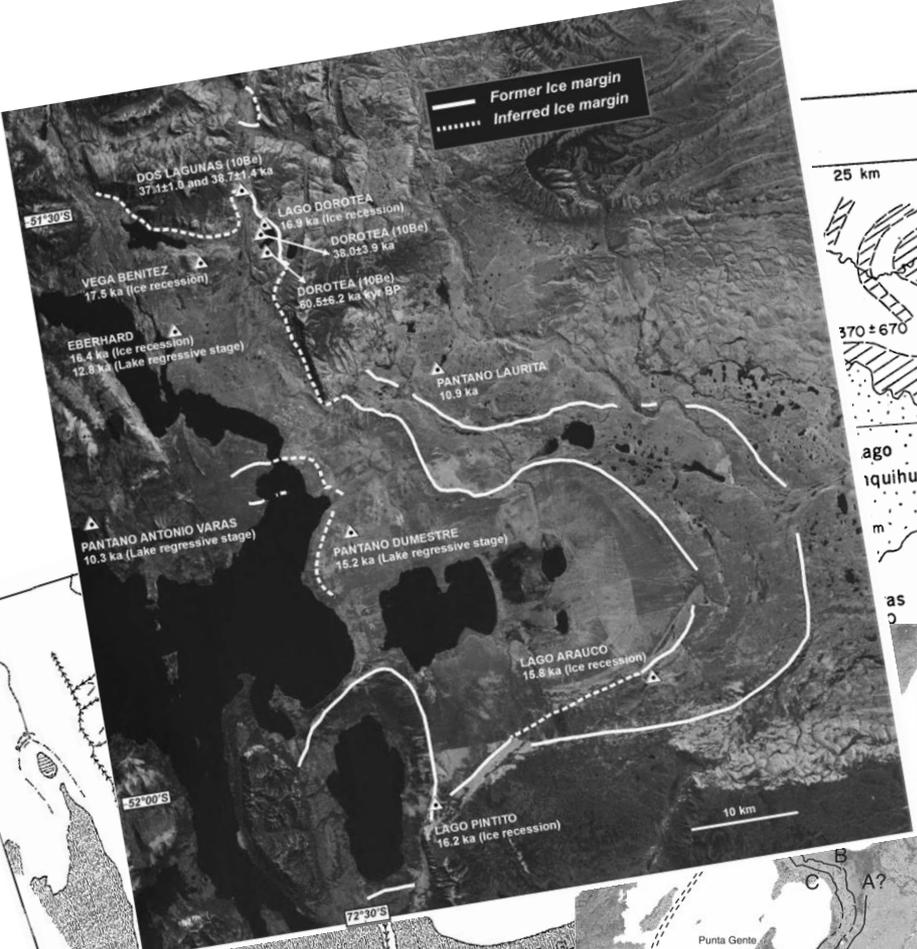
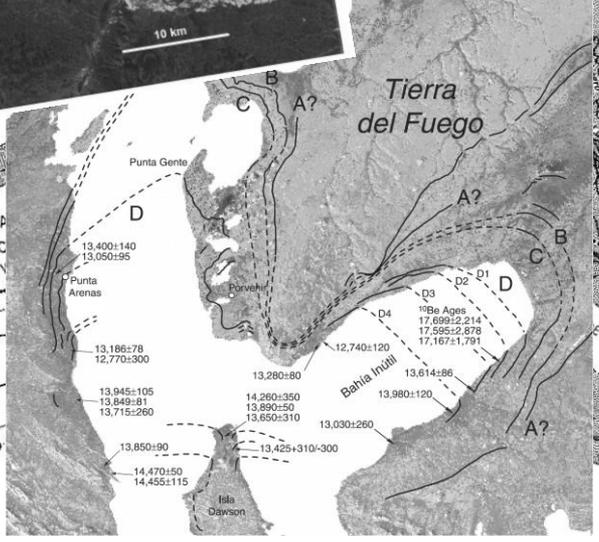
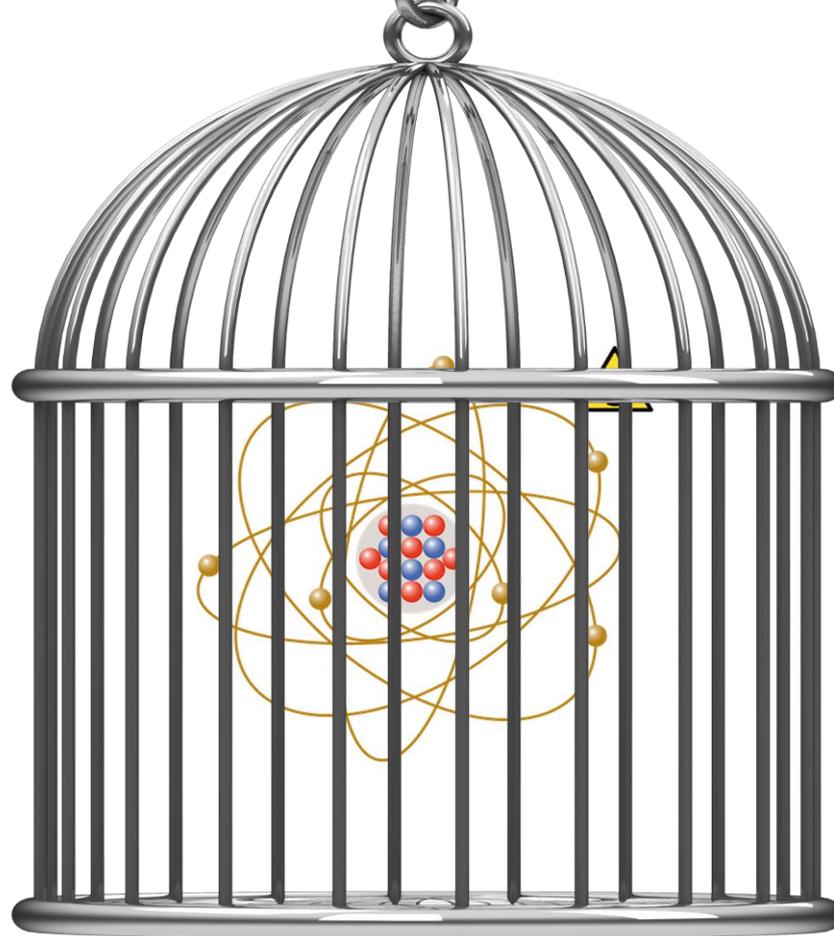


Fig. 5. Glaciers of Cerro

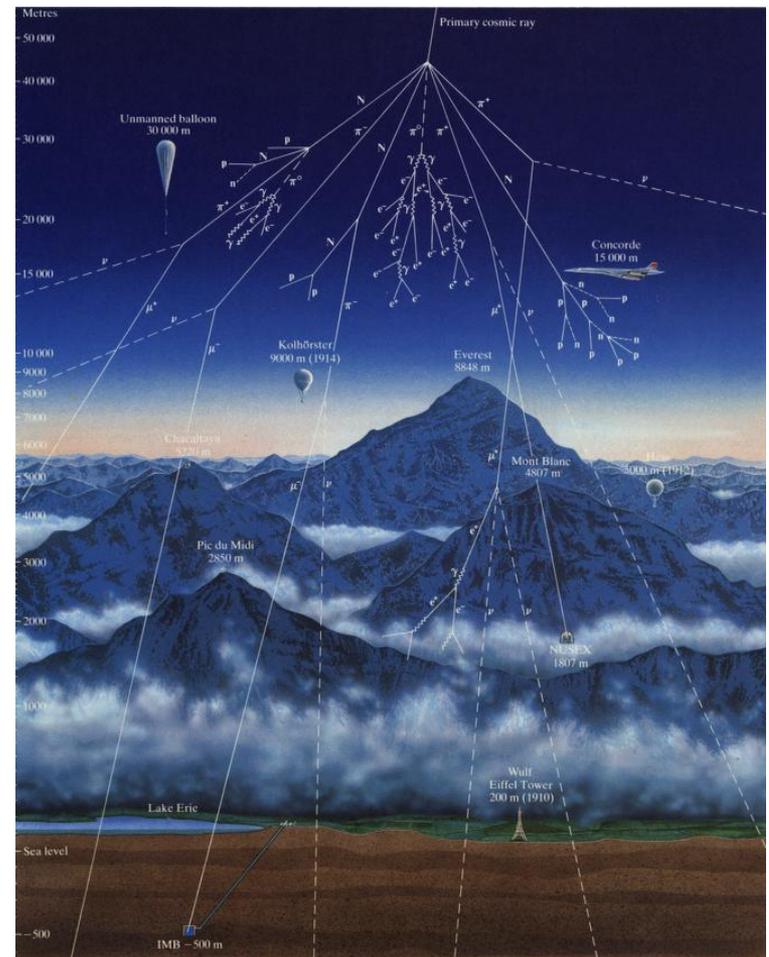




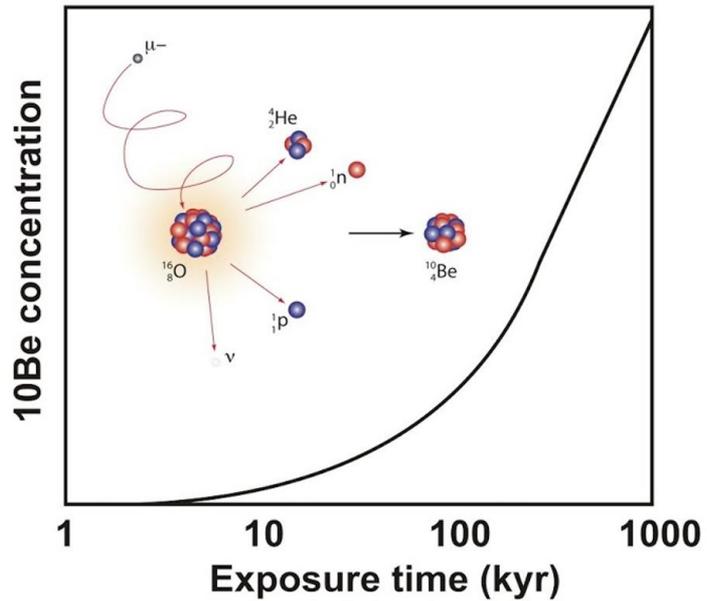
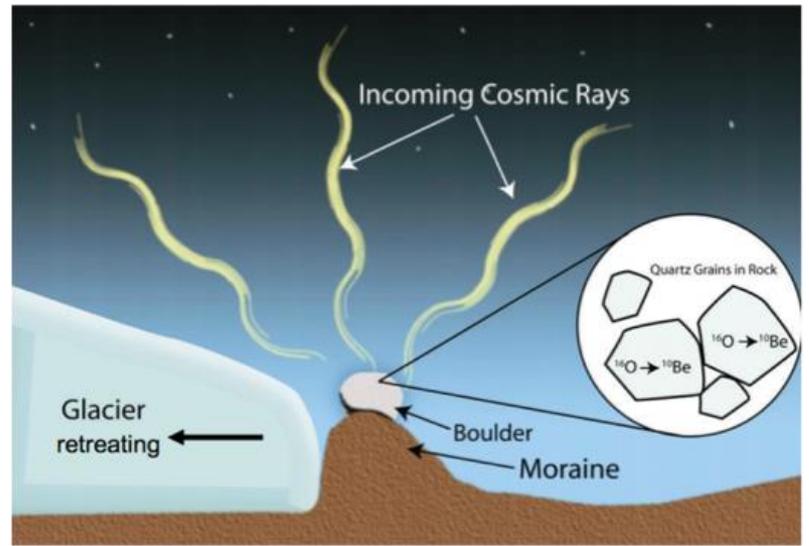
- ❑ Disponibilidad de materia orgánica
- ❑ No son dataciones directas (i.e., edades mínimas y máximas)
- ❑ < 50.000 años (?)

Dataciones de superficies de exposición

Dataciones por nucleidos cosmogénicas



- ~~Disponibilidad de materia orgánica~~
- ~~No son dataciones directas (i.e., edades mínimas y máximas)~~
- ~~< 50.000 años (?)~~ **4.000.000 de años**



The large MIS 4 and long MIS 2 glacier maxima on the southern tip of South America

Carly Peltier^{a,b,*}, Michael R. Kaplan^b, Sean D. Birkel^c, Rodrigo L. Soteres^{d,e}, Esteban A. Sagredo^{d,e,f}, Juan Carlos Aravena^g, José Araos^h, Patricio I. Moreno^{i,e}, Roseanne Schwartz^b, Joerg M. Schaefer^{a,b}



The last two glacial cycles in central Patagonia: A precise record from the Ñirehuao lobe

Carly Peltier^{a,b,c,*}, Michael R. Kaplan^b, Sean D. Birkel^d, Esteban A. Sagredo^{e,f}, Patricio I. Moreno^{g,f}, José Araos^h, Rodrigo Villa-Martínez^{f,g,i,j}, Roseanne Schwartz^b, Joerg M. Schaefer^{a,b}

(en preparación)

Short Communication

Trans-pacific glacial response to the Antarctic Cold Reversal in the southern mid-latitudes

Esteban A. Sagredo^{a,*}, Michael R. Kaplan^b, Paola S. Araya^a, Thomas V. Lowell^c, Juan C. Aravena^d, Patricio I. Moreno^e, Meredith A. Kelly^f, Joerg M. Schaefer^{b,g}



RESEARCH ARTICLE

Glacier Fluctuations in the Northern Patagonian Andes (44°S) Imply Wind-Modulated Interhemispheric in Phase Paleoclimates During Termination 1

> Rodrigo L. Soteres, Esteban A. Sagredo, Michael R. Kaplan, Mateo A. Martini, Patricio I. Moreno, Scott A. Reynhout, Roseanne Schwartz, Joerg M. Schaefer

DOI: [10.21203/rs.3.rs-1389274/v1](https://doi.org/10.21203/rs.3.rs-1389274/v1) Download PDF

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Quaternary Research (2022), 105, 166–181
doi:10.1017/qua.2021.45

Research Article

Holocene glacier history of northeastern Cordillera Darwin, southernmost South America (55°S)

Scott A. Reynhout^{a,b}, Michael R. Kaplan^c, Esteban A. Sagredo^{b,d,e*}, Juan Carlos Aravena^f, Rodrigo L. Soteres^{b,d}, Roseanne Schwartz^e and Joerg M. Schaefer^{e,g}

ORIGINAL RESEARCH article

Front. Earth Sci., 22 December 2021 | <https://doi.org/10.3389/feart.2021.813433>



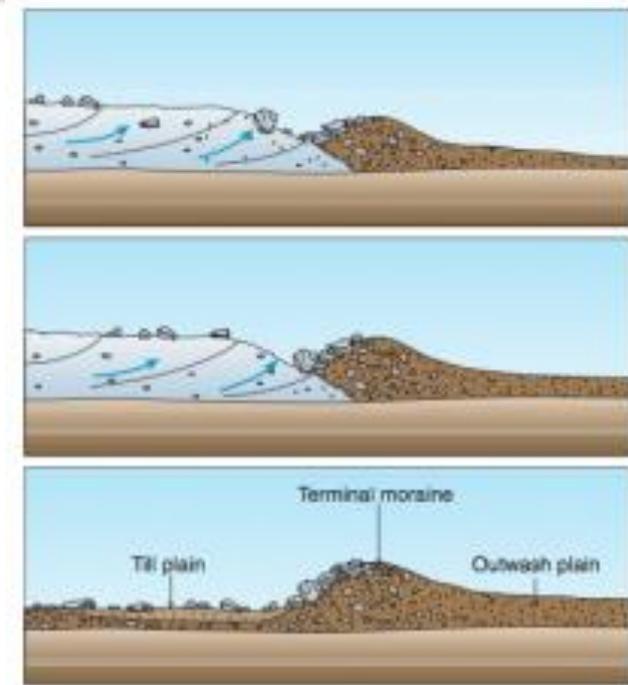
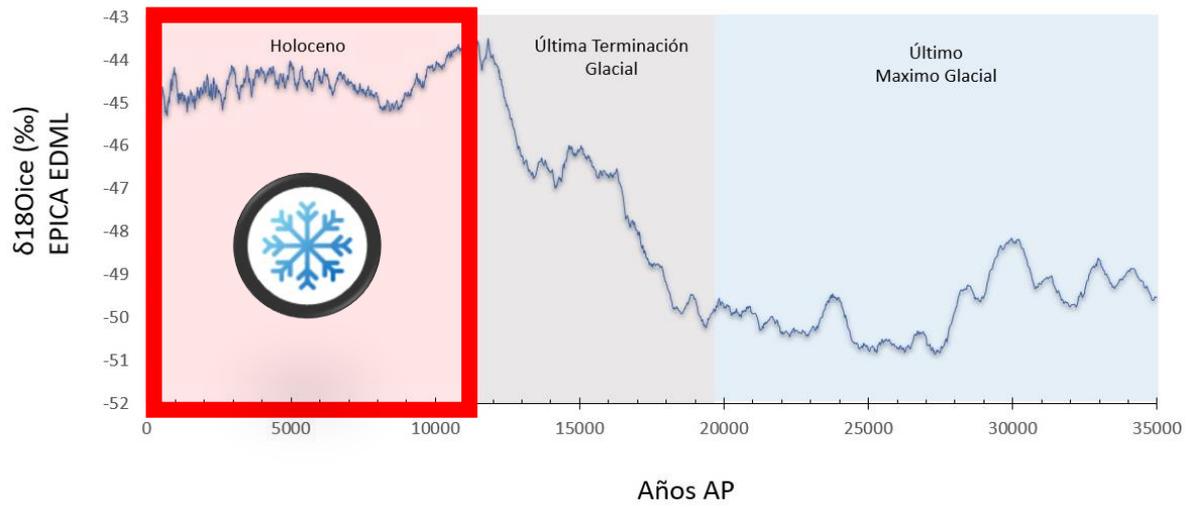
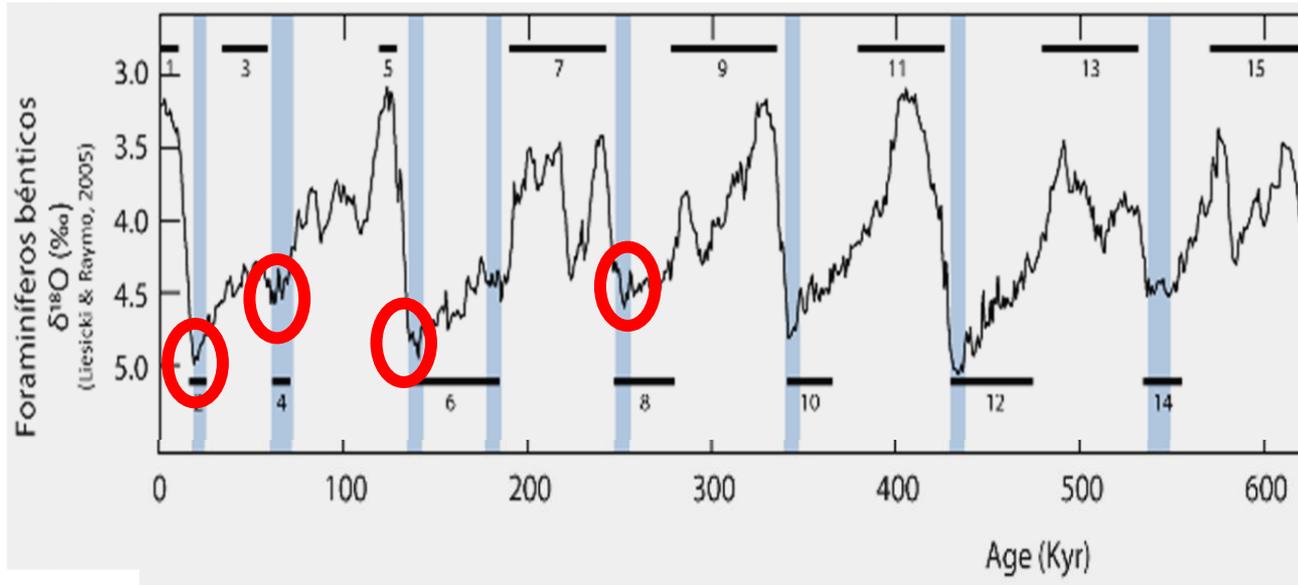
Holocene History of Río Tranquilo Glacier, Monte San Lorenzo (47°S), Central Patagonia

Esteban A. Sagredo^{1,2,3,*}, Scott A. Reynhout^{2,4}, Michael R. Kaplan⁵, Juan C. Aravena⁶, Paola S. Araya⁷, Brian H. Luckman⁸, Roseanne Schwartz⁹ and Joerg M. Schaefer^{5,9}

Holocene glacier fluctuations in Patagonia are modulated by summer insolation intensity and paced by Southern Annular Mode-like variability

Scott A. Reynhout^{a,b}, Esteban A. Sagredo^{b,c,*}, Michael R. Kaplan^{d,e}, Juan Carlos Aravena^c, Mateo A. Martini^f, Patricio I. Moreno^{b,g}, Maisa Rojas^{b,h,j}, Roseanne Schwartz^d, Joerg M. Schaefer^{d,i}



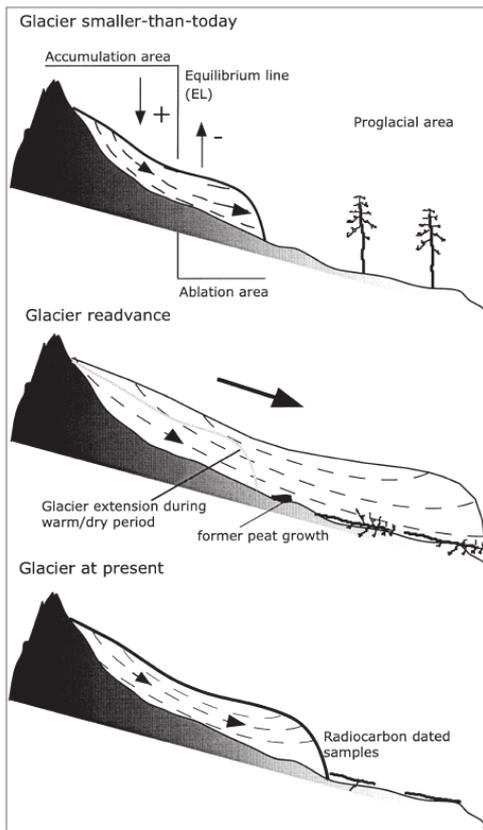


¿pero qué pasó con los glaciares durante períodos cálidos extremos del pasado?

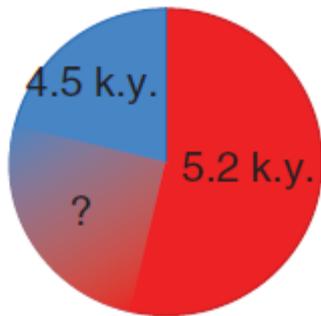


Foto: S. Reynhout

Glaciar Schiaparelli, Cordillera Darwin, Chile (54°S)

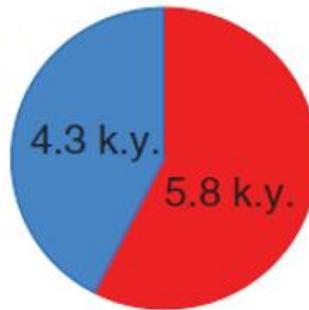


(Hormes et al 2001)



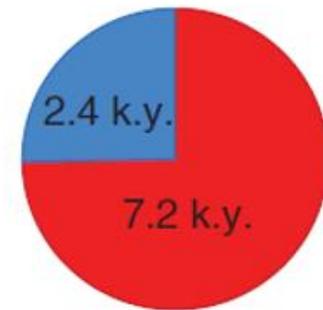
Bernina, Valais, and Grimsel Glaciers

(Joerin et al 2006)



Engadine, Switzerland

(Leeman and Niessen, 1994)



Jostedalsbreen, Norway

(Nesje, 2001)

Foto: S. Reynhout
Glaciar Torre (49°S)



¿Y esto es lo mejor que podemos hacer?



LAMONT-DOHERTY
EARTH OBSERVATORY
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY

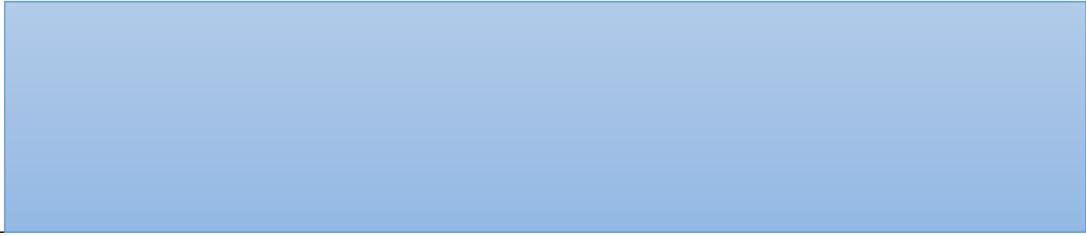


700.000 años



30.000 años

(descubierto)



MÁS PEQUEÑO QUE EN EL PRESENTE

(descubierto)



MÁS GRANDE QUE EN EL PRESENTE



The Rhone Glacier was smaller than today for most of the Holocene

Brent M. Goehring^{1,5}, Joerg M. Schaefer¹, Christian Schluechter², Nathaniel A. Lifton^{3*}, Robert C. Finkel⁴, A.J. Timothy Jull⁶, Naki Akçar², and Richard B. Alley⁵

© 2011 Geological Society of America. For permission to copy, contact Copyright Permissions, GSA, or editing@geosociety.org. *Geology*, July 2011; v. 39; no. 7; p. 679–682; doi:10.1130/G32145.1; 4 figures; Data Repository item 2011209.

RESEARCH ARTICLE | SEPTEMBER 18, 2020

Similar Holocene glaciation histories in tropical South America and Africa

Anthony C. Vickers; Jeremy D. Shakun; Brent M. Goehring; Andrew Gorin; Meredith A. Kelly; Margaret S. Jackson; Alice Doughty; James Russell

Geology (2020)

Glacier response to Holocene warmth inferred from in situ ¹⁰Be and ¹⁴C bedrock analyses in Steingletscher's forefield (central Swiss Alps)

Irene Schimmelpfennig¹, Joerg M. Schaefer², Jennifer Lamp², Vincent Godard¹, Roseanne Schwartz², Edouard Bard¹, Thibaut Tuna¹, Naki Akçar³, Christian Schluechter³, Susan Zimmerman⁴, and ASTER Team⁺

Greenland was nearly ice-free for extended periods during the Pleistocene

Joerg M. Schaefer^{1,2}, Robert C. Finkel^{1,3}, Greg Balco⁴, Richard B. Alley⁵, Marc W. Caffee⁶, Jason P. Briner⁷, Nicolas E. Young¹, Anthony J. Gow⁸ & Roseanne Schwartz¹

252 | NATURE | VOL 540 | 8 DECEMBER 2016

Geophysical Research Letters

RESEARCH LETTER

10.1002/2016GL072394

Key Points:

- Barnes Ice Cap will probably disappear

The projected demise of Barnes Ice Cap: Evidence of an unusually warm 21st century Arctic

A. Gilbert¹ , G. E. Flowers¹ , G. H. Miller² , K. A. Refsnider², N. E. Young³ , and V. Radic⁴ 

