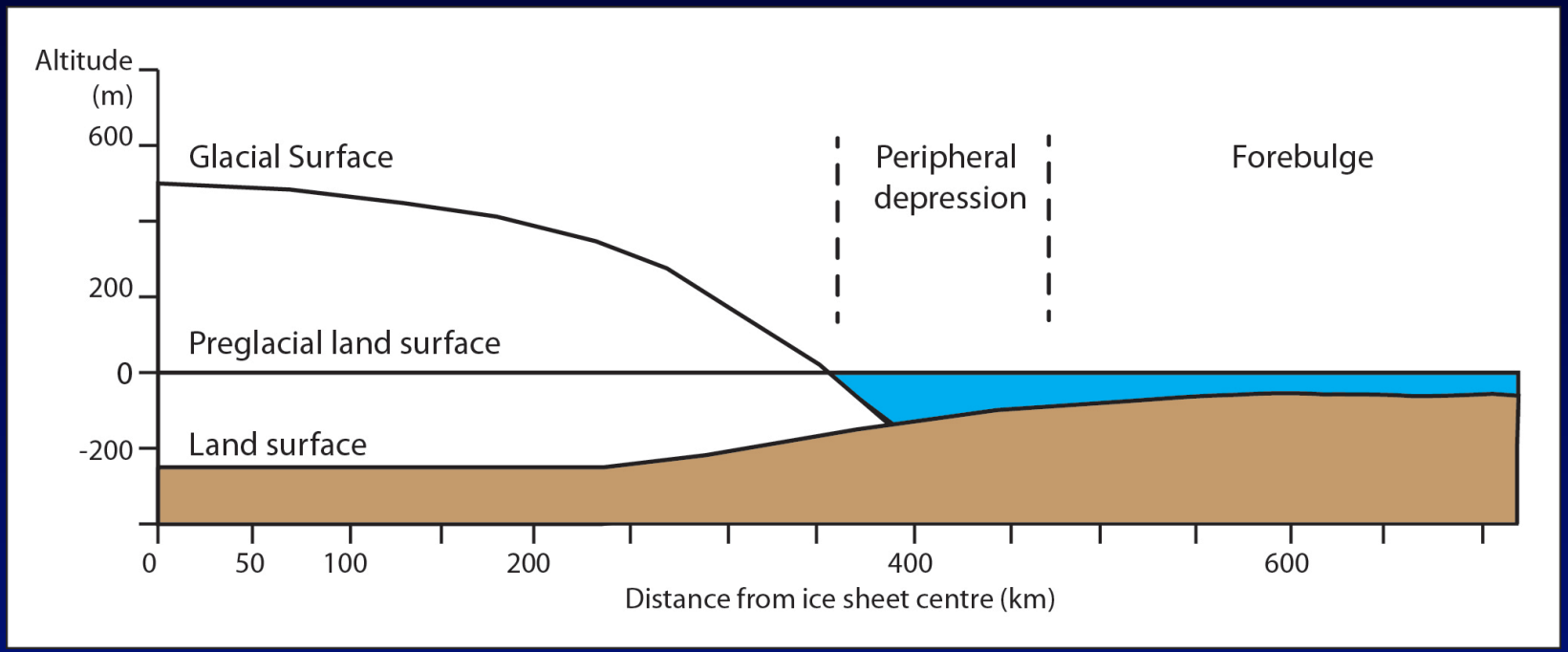
Glacioisostatic-induced depositional moats in coastal environments

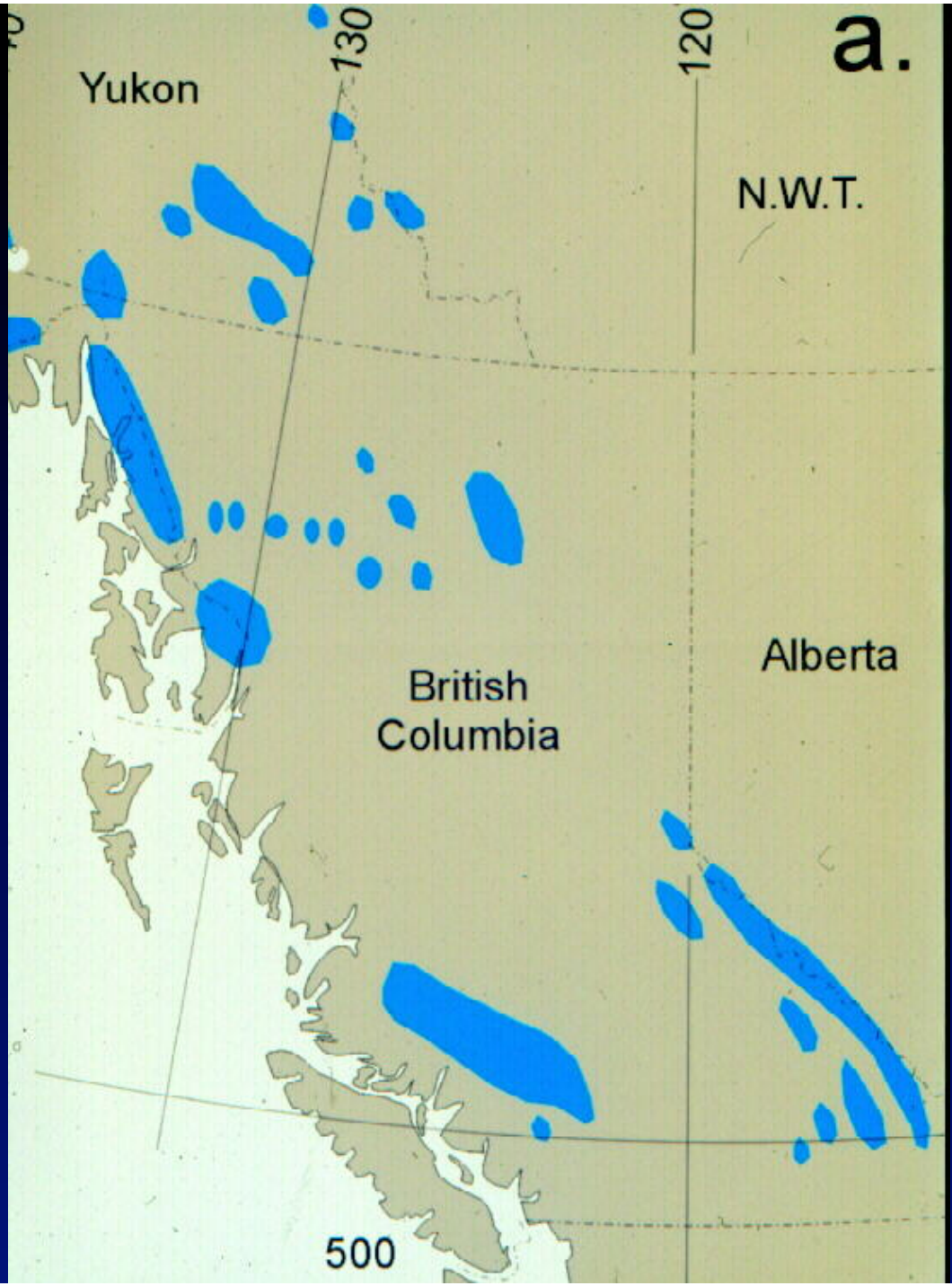
John J. Clague and Corinne Griffing
SFU Department of Earth Sciences

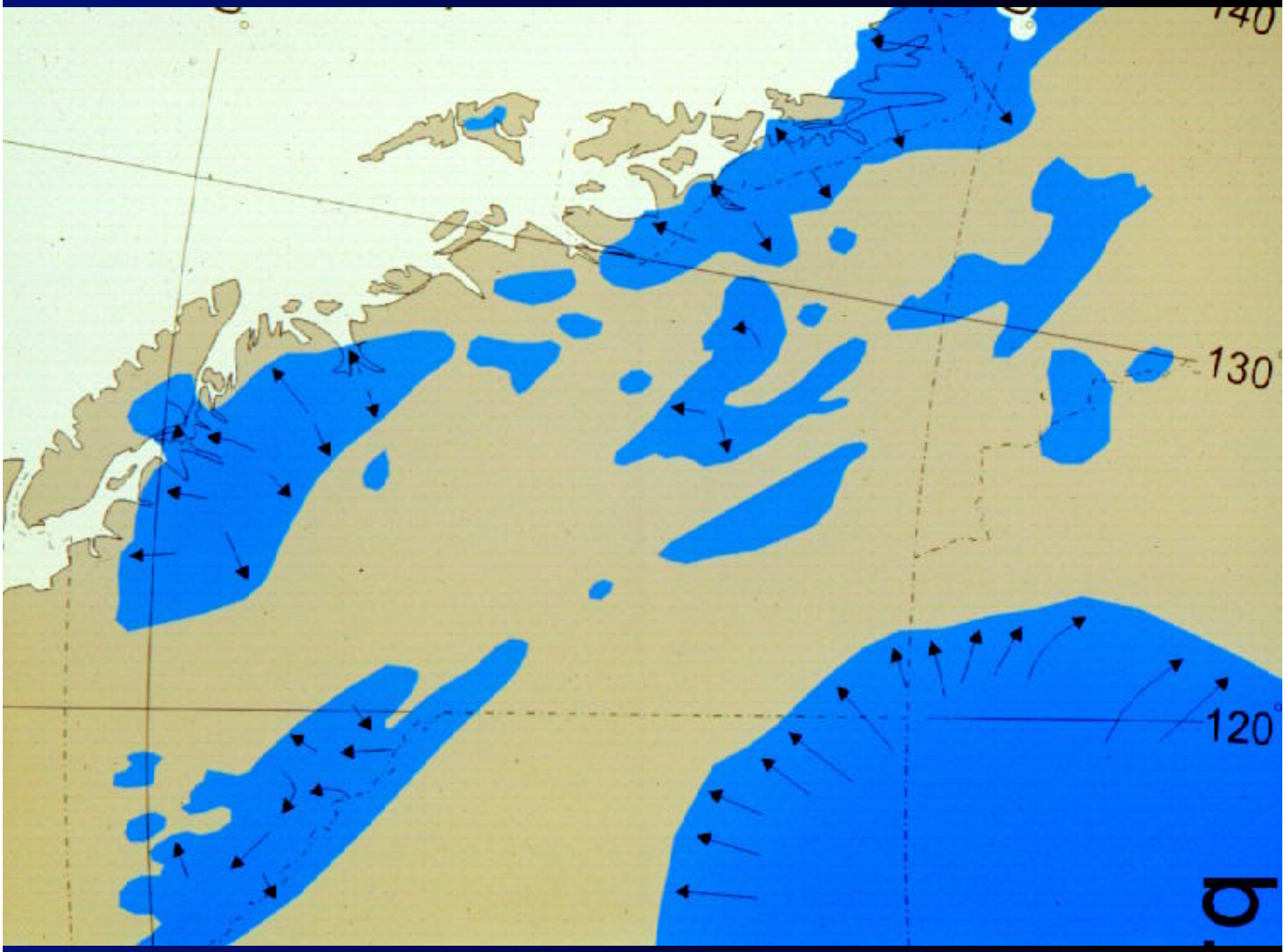
Glacio-isostatic depression can create the accommodation space required to explain thick sequences of sediment in areas of ice sheet glaciation

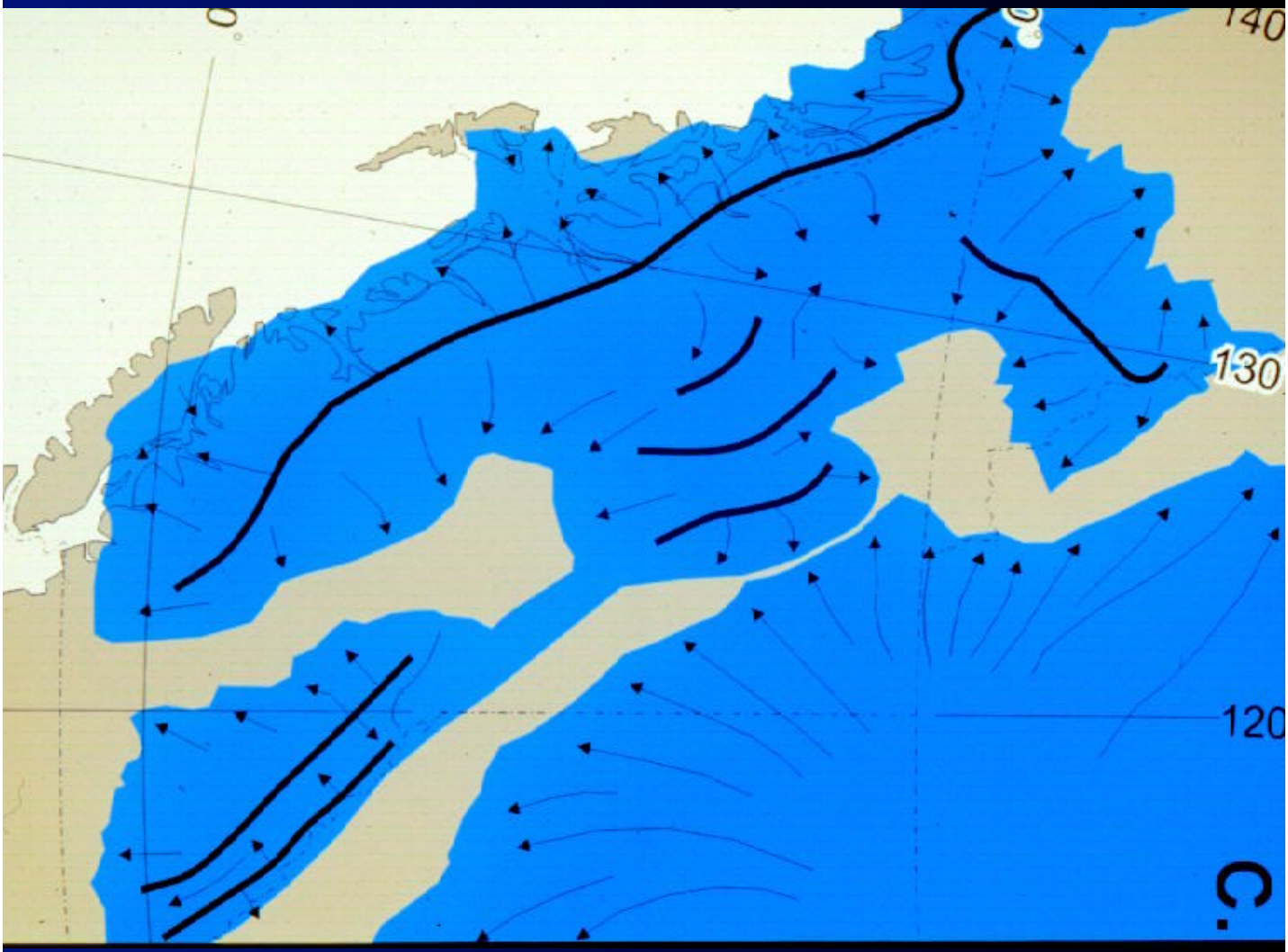
Glacier damming is not required to account for this accommodation space

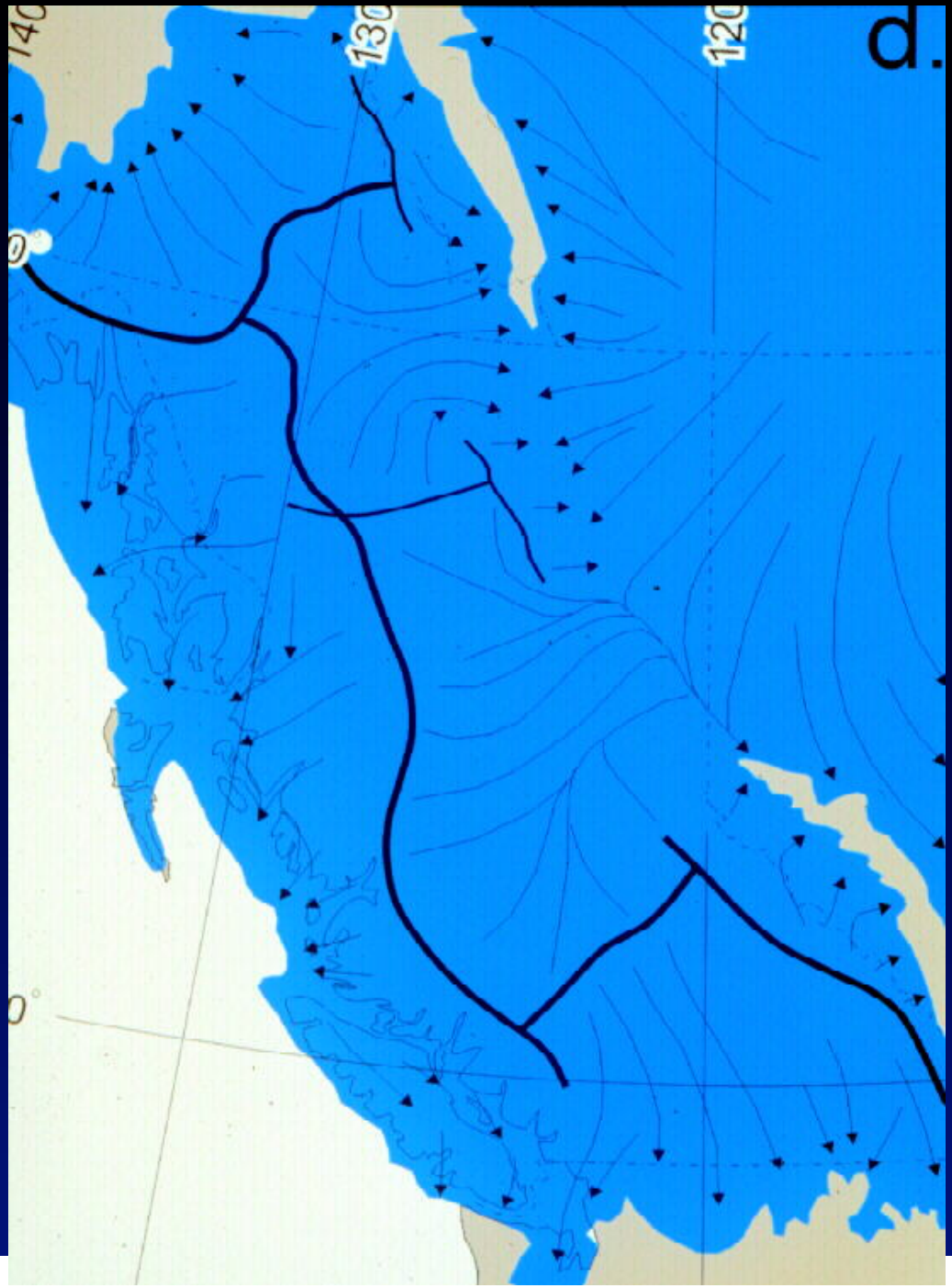


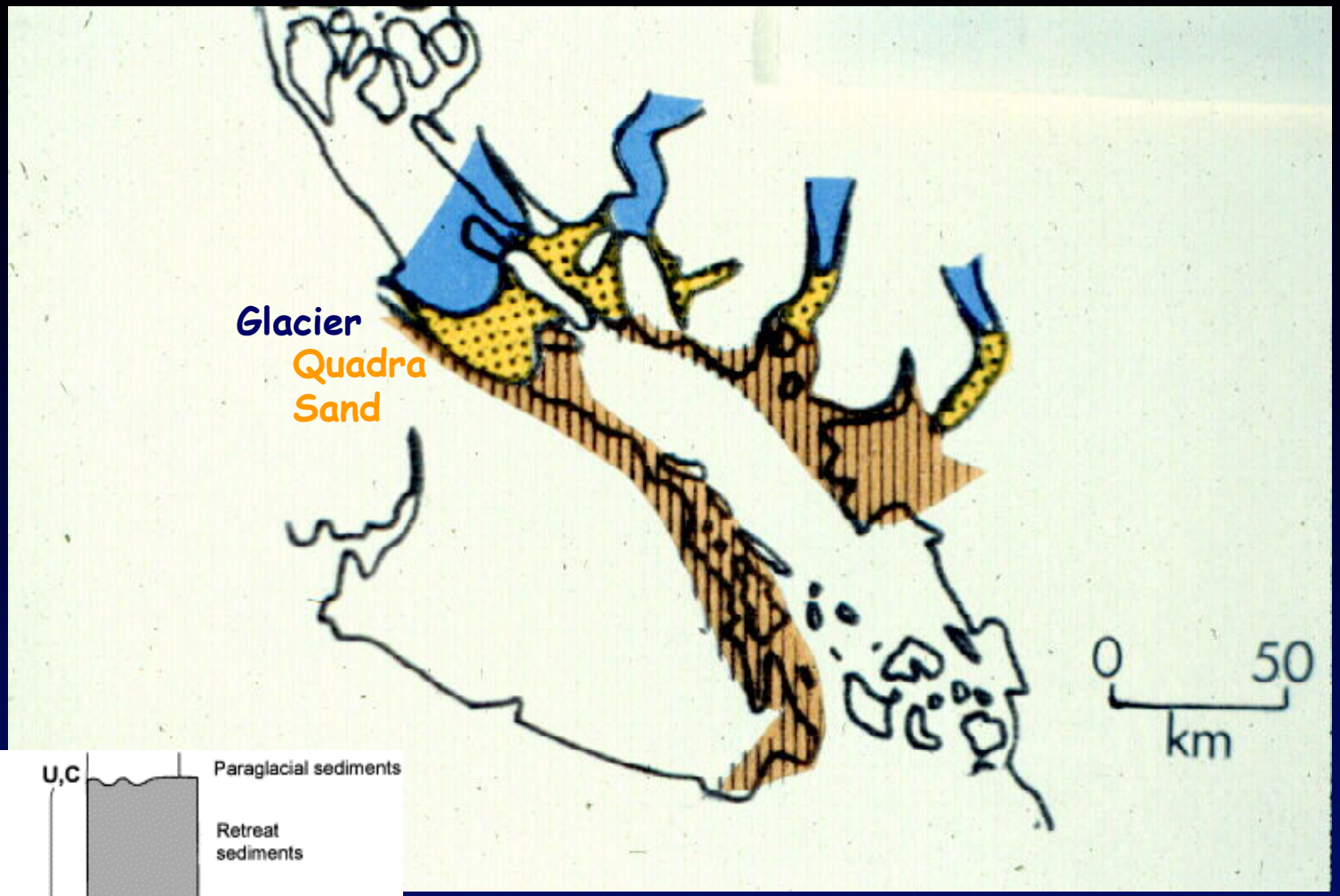
An example from Western Canada

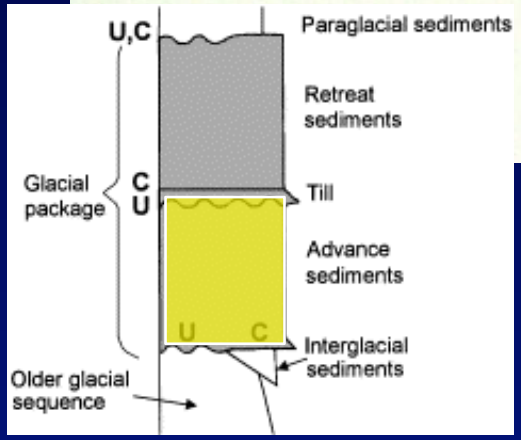

a.
Yukon
130
120
N.W.T.
Alberta
British
Columbia
500

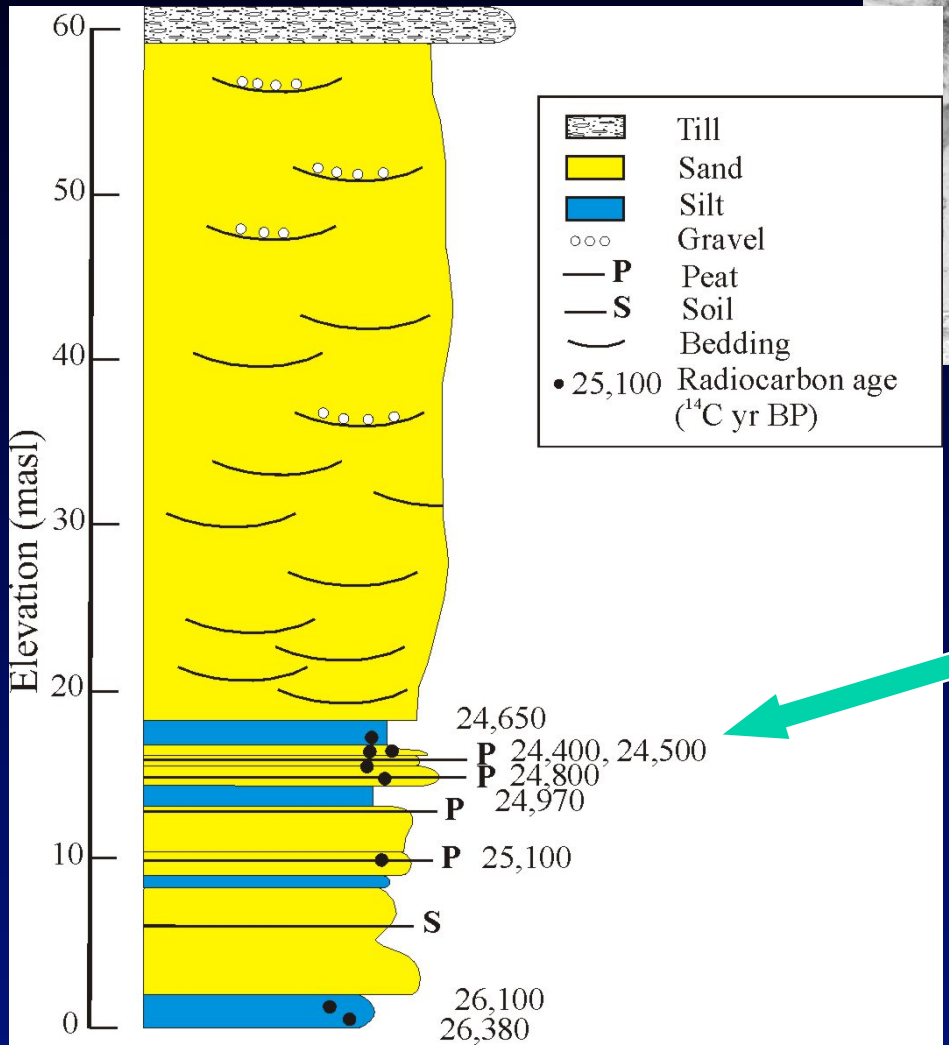

140
130
120

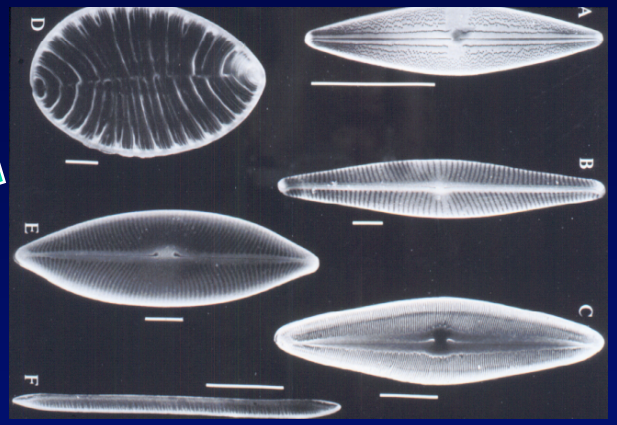

140
130
120

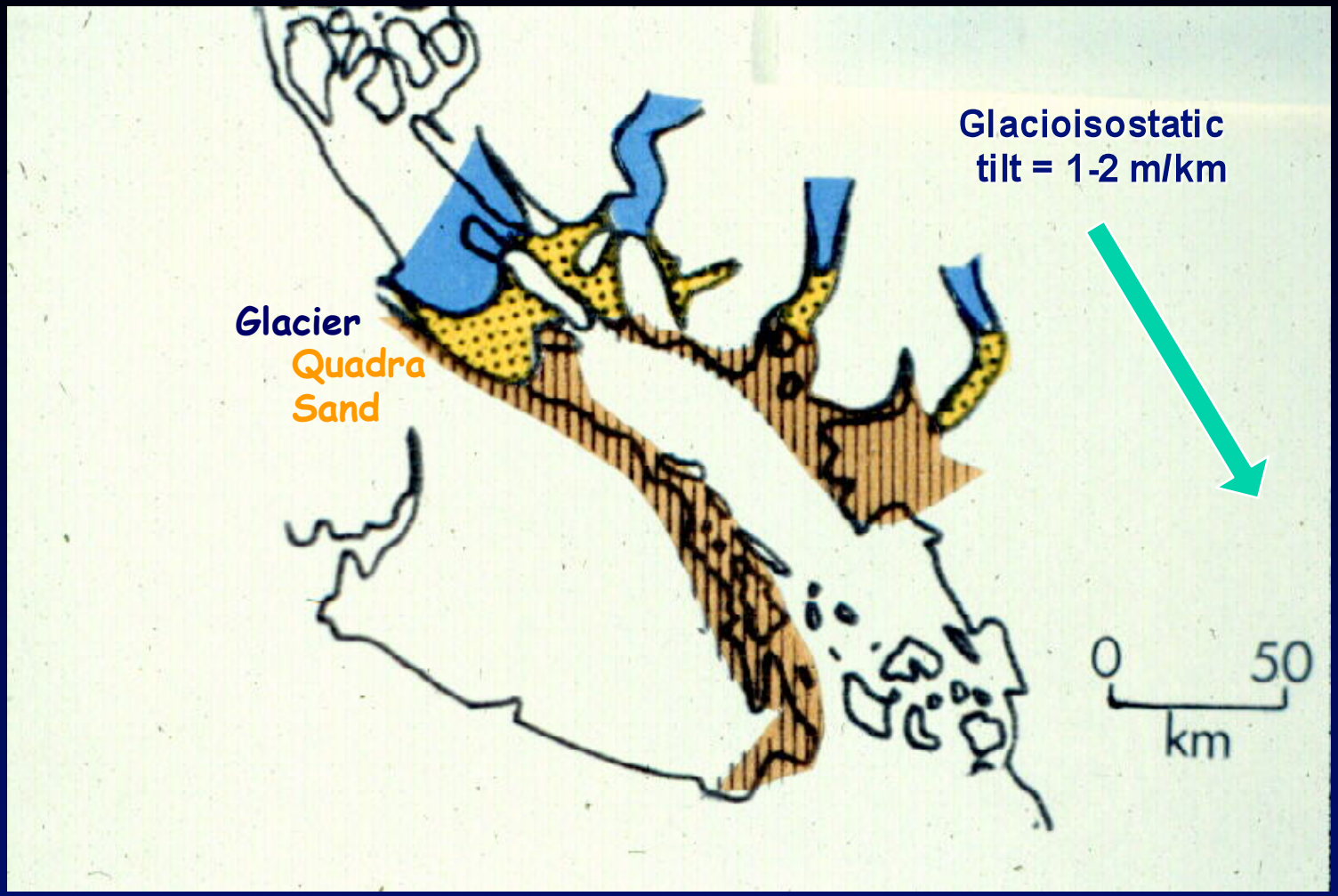

d.


Glacier
Quadra
Sand
0
50
km

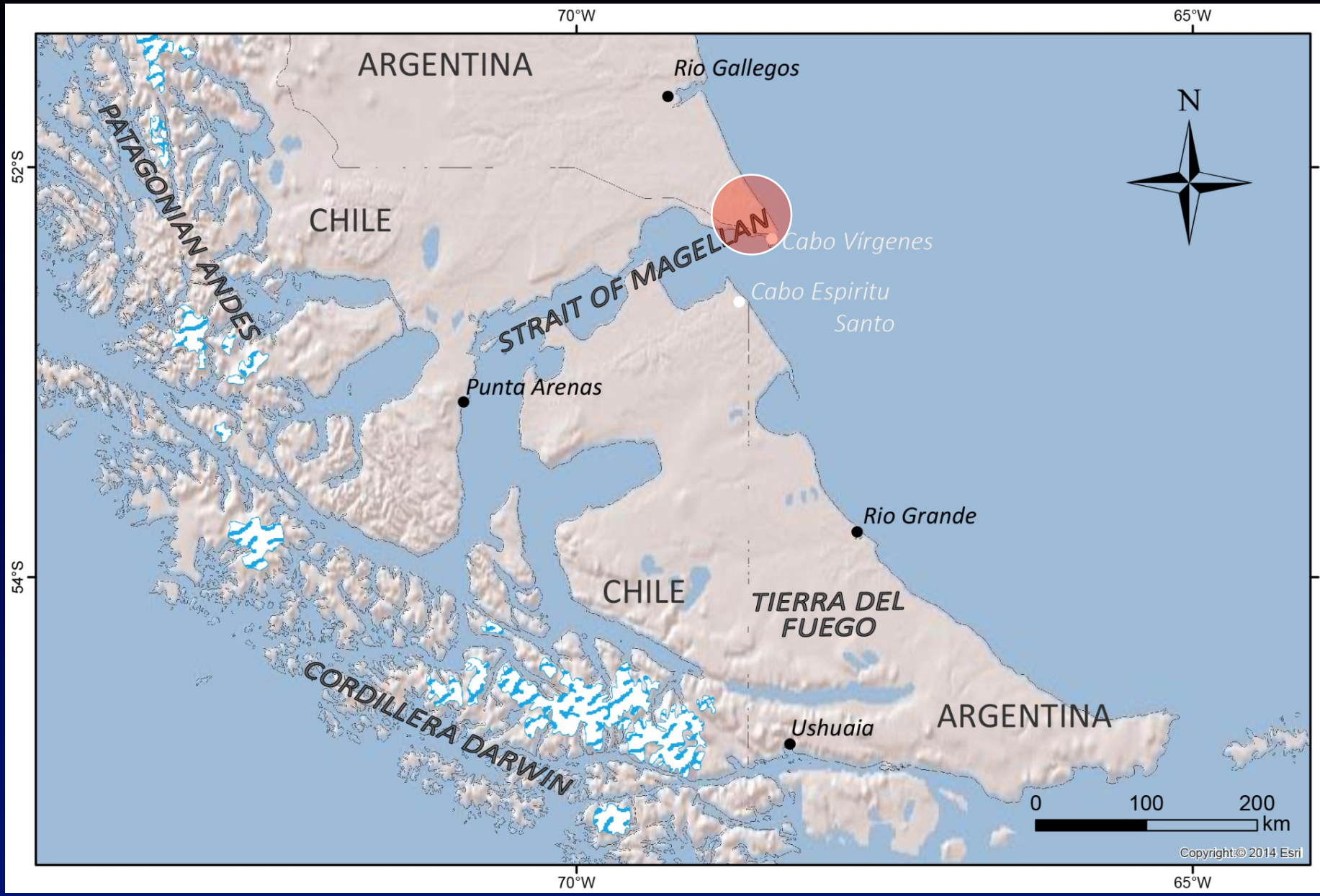

U,C
Paraglacial sediments
Retreat sediments
Glacial package
C
U
Till
Advance sediments
U
C
Interglacial sediments
Older glacial sequence

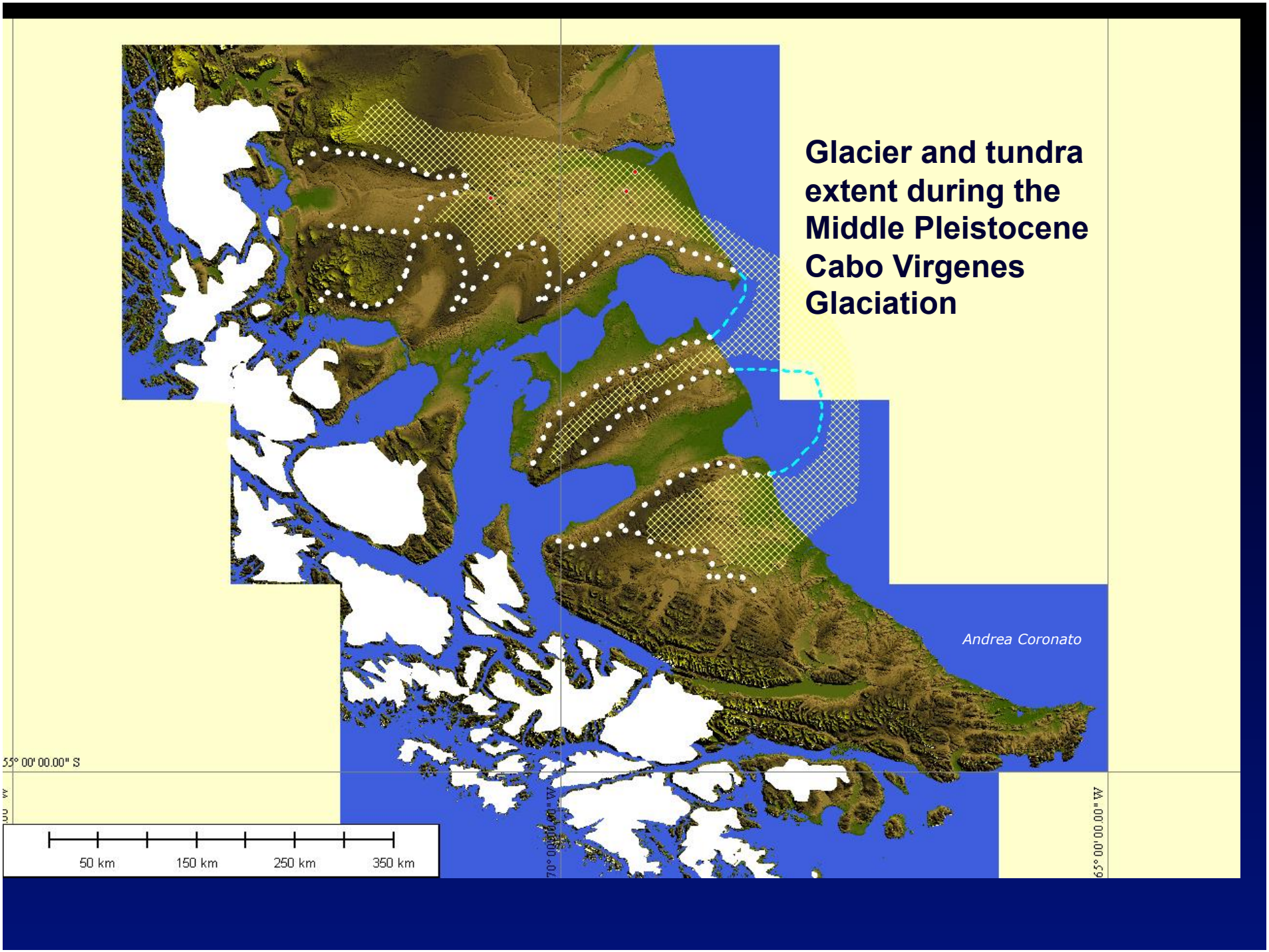

Elevation (masl)
60
50
40
30
20
10
0
Till
Sand
Silt
Gravel
P Peat
S Soil
Bedding
• 25,100 Radiocarbon age
(14C yr BP)
24,650
P 24,400, 24,500
P 24,800
P 24,970
P 25,100
S
26,100
26,380


A
B
C
D
E
F

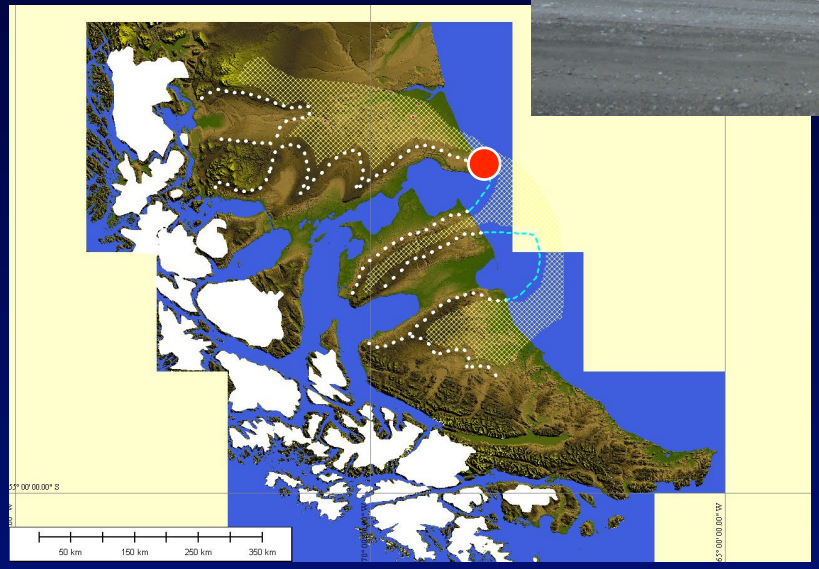

Glacioisostatic
tilt = 1-2 m/km
Glacier
Quadra
Sand
0
50
km

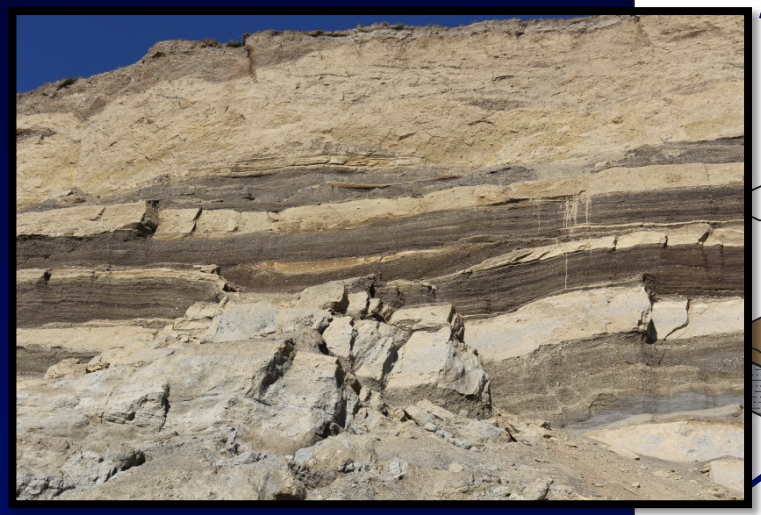
An example from Argentina

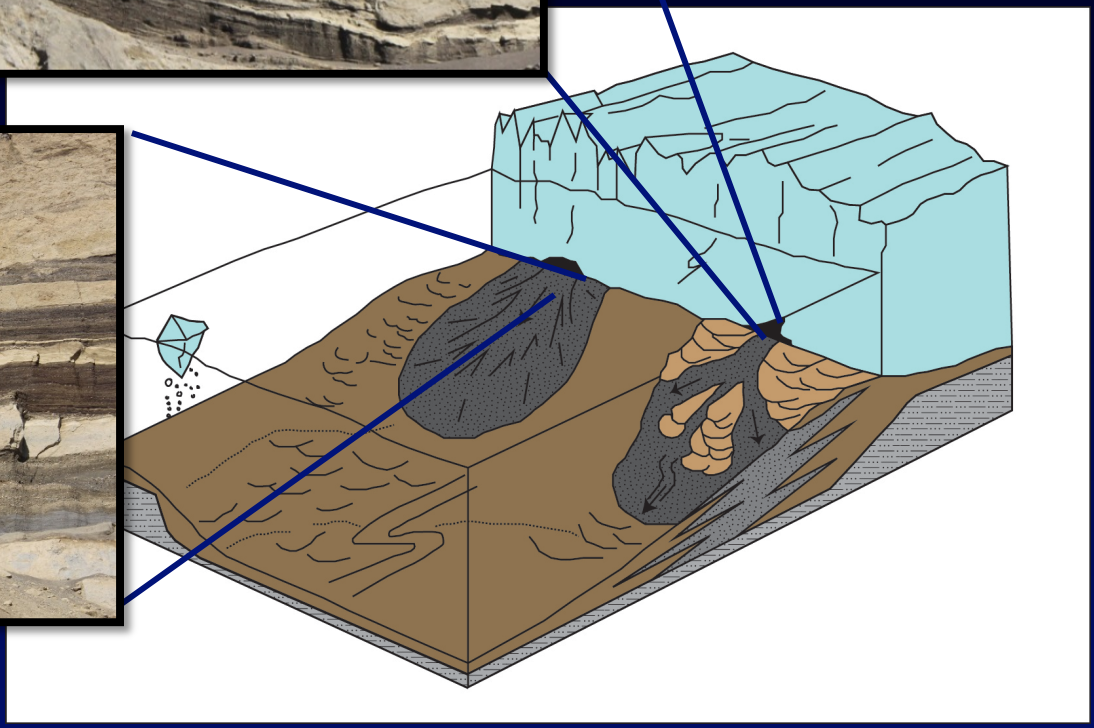

70°W
65°W
52°S
54°S
ARGENTINA
Rio Gallegos
N
PATAGONIAN ANDES
CHILE
STRAIT OF MAGELLAN
Cabo Vírgenes
Cabo Espiritu Santo
Punta Arenas
Rio Grande
CHILE
TIERRA DEL FUEGO
CORDILLERA DARWIN
ARGENTINA
Ushuaia
0
100
200
km
Copyright © 2014 Esri


Glacier and tundra extent during the Middle Pleistocene Cabo Virgenes Glaciation
Andrea Coronato
50 km
150 km
250 km
350 km


Ice-proximal drift
Glaciolacustrine sediments


50 km
150 km
250 km
350 km

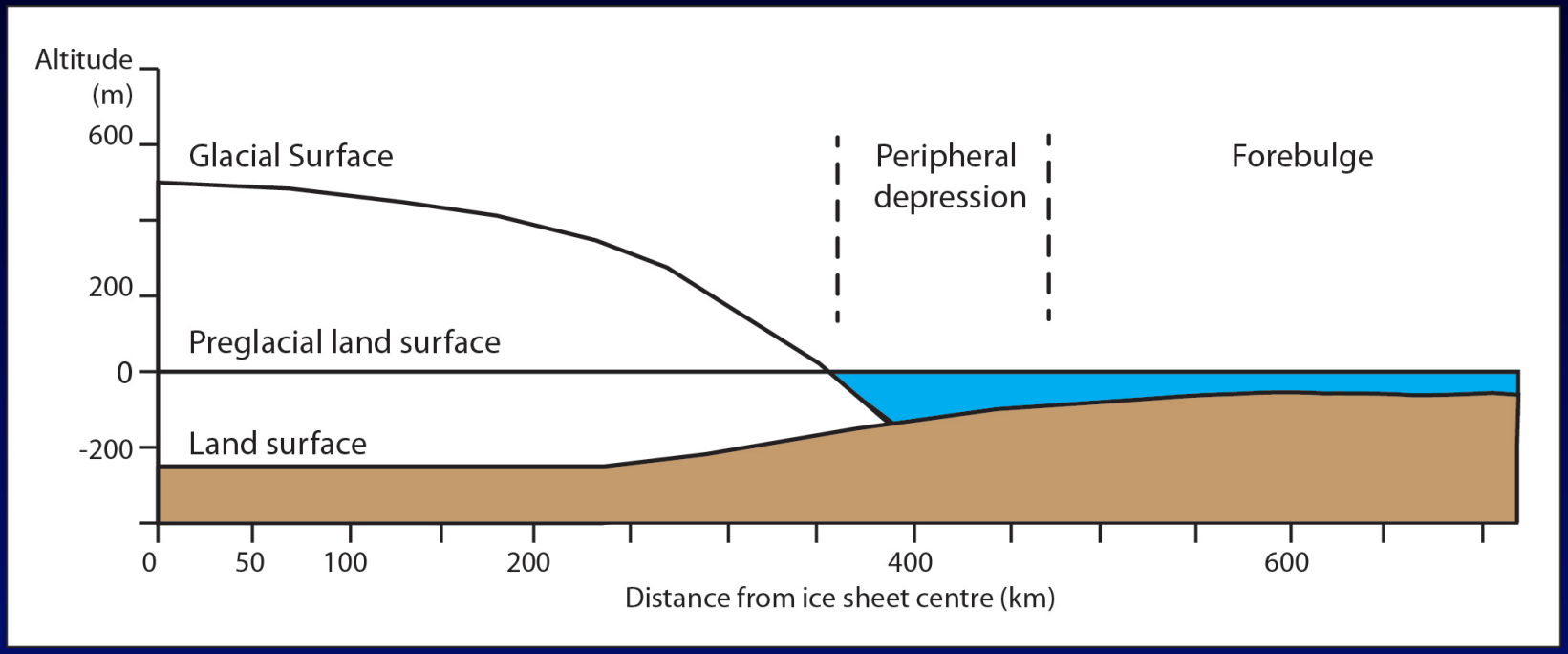




Sheet gravel, sand, and diamict deposited in ponded water from meltwater and sediment-density currents

Bennett et al., 2002

Subaqueous deposition at modern coast, but no evidence of marine environment



Modified from Benn and Evans, 2010

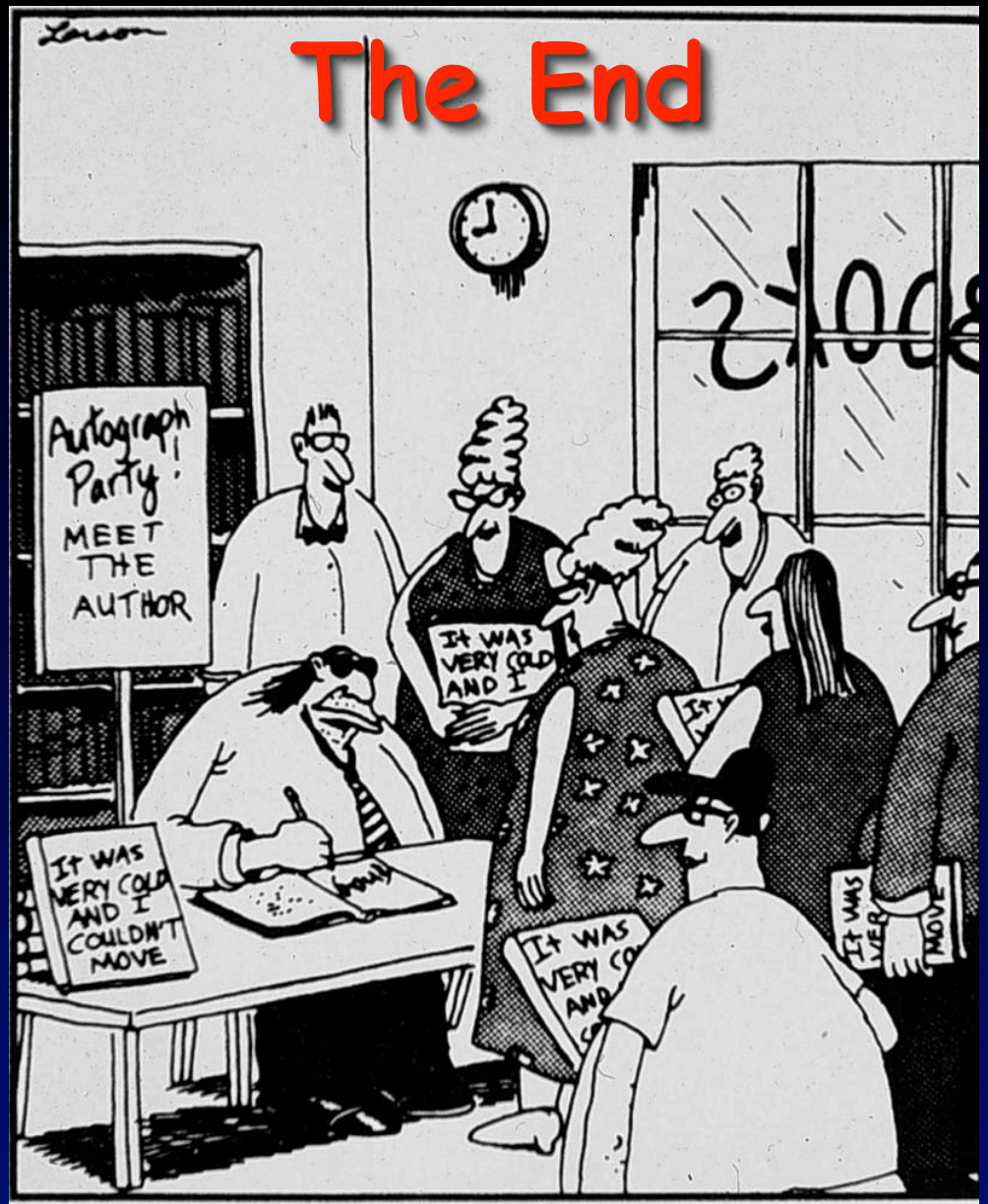

East Atlantic coast
West Andes
Datum
Depositional accommodation space
Glacioisostatic tilt
Glacioisostatic tilt
Río Gallegos,
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth

Summary

- *Glacio-isostatic depression can create the accommodation space required to explain thick sequences of sediment in areas of ice sheet glaciation*

- *Glacier damming is not required to account for this accommodation space*

The End



After being frozen in ice for 10,000 years,
Thag promotes his autobiography.