



Western Canadian Cryospheric Network

wc2n.unbc.ca

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Western Canadian Cryospheric Network (WC²N)



Investigators:

Andrew Bush (U. Alberta); John Clague (SFU); Garry Clarke (UBC); Stephen Déry (UNBC); Peter Jackson (UNBC); Shawn Marshall (U. Calgary); Brian Menounos (UNBC); Dan Moore (UBC); Dan Smith (U. Victoria); Eric Steig (U. Washington); Roger Wheate (UNBC)

Research Collaborators:

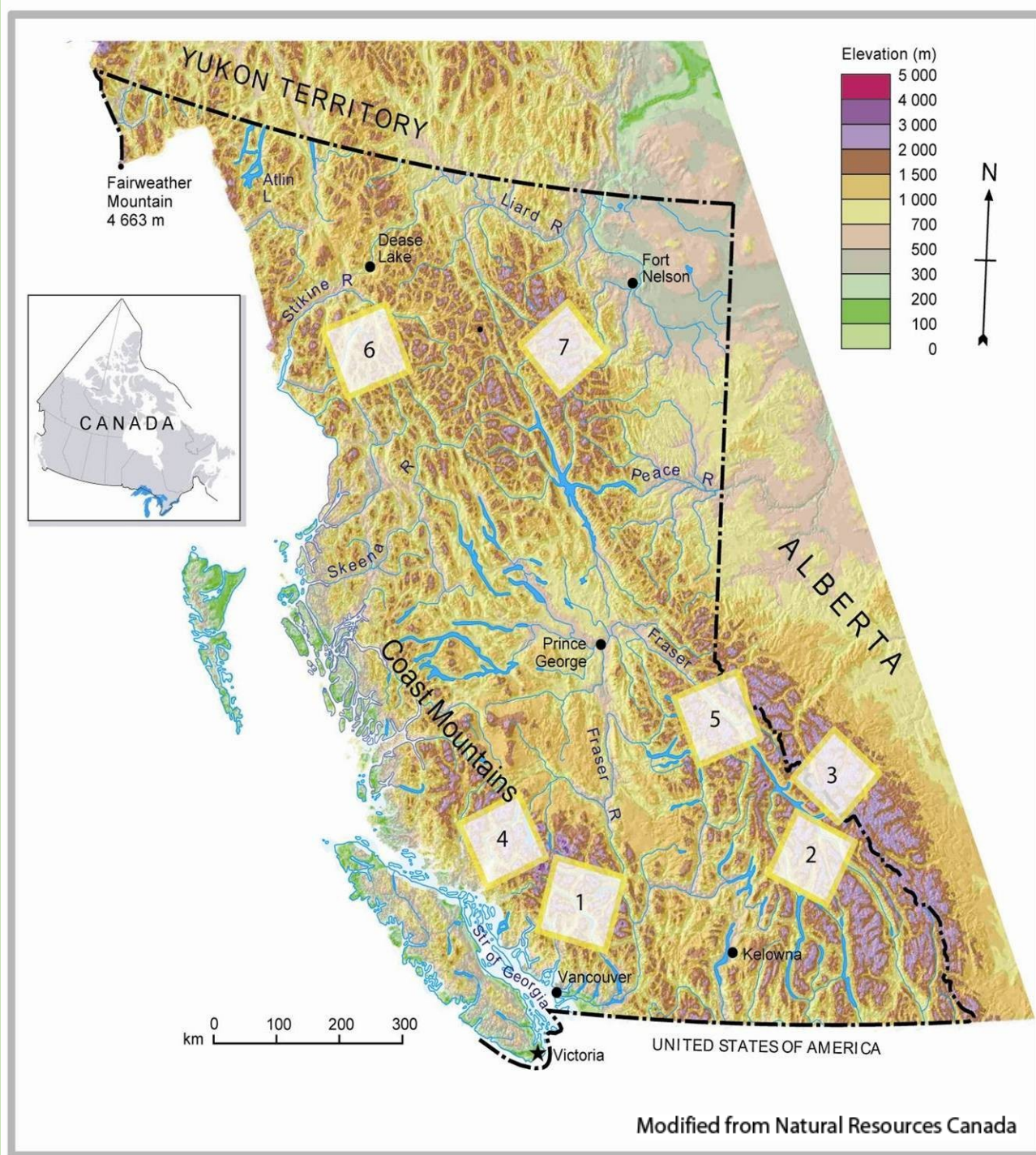
Doug Clark (Western Washington University); Mike Demuth (Natural Resources Canada); Joseph McConnell (Desert Research Institute - U. Nevada); Sonia Talwar (Natural Resources Canada); Paul Whitfield (Environment Canada)

Research Partners:

BC Hydro; BC Ministry of Sustainable Resources Management; BC Parks; BC Ministry of Environment (MoE); Columbia Basin Trust (CBT); Fisheries and Oceans Canada (DFO); Environment Canada - Cryosphere System in Canada (CRYSYS); Environment Canada - Meteorological Service of Canada (MSC); Global Land Ice Measurement from Space (GLIMS); Natural Resources Canada - National Glaciology Programme (NGP); Natural Resources Canada - Terrain Sciences Division National Snow and Ice Data Center (NSIDC); Parks Canada

Targeted Regions

- 1) S. Coast Mountains (BC Hydro)
- 2) Columbia, Selkirks (BC Hydro; CBT)
- 3) S. Rockies
- 4) Waddington, Homathko
- 5) Cariboo Mtns. (Quesnel)
- 6) Central-N. Coast
- 7) N. Rockies



Modified from Natural Resources Canada



- Research Objectives

What we know:

Document glacier extent and North Pacific climate variability
(400 yrs ago to present)

How it works:

Detail meteorological processes and their links to glacier nourishment
(glacier mass balance)

What's going to happen:

Predict how glaciers will respond to projected climate change over the next
50-150 years

Assessing the state of glaciers

- Requires methods to detect changes in area and volume
 - Historical maps and oblique photography
 - Aerial photography
 - Satellite imagery

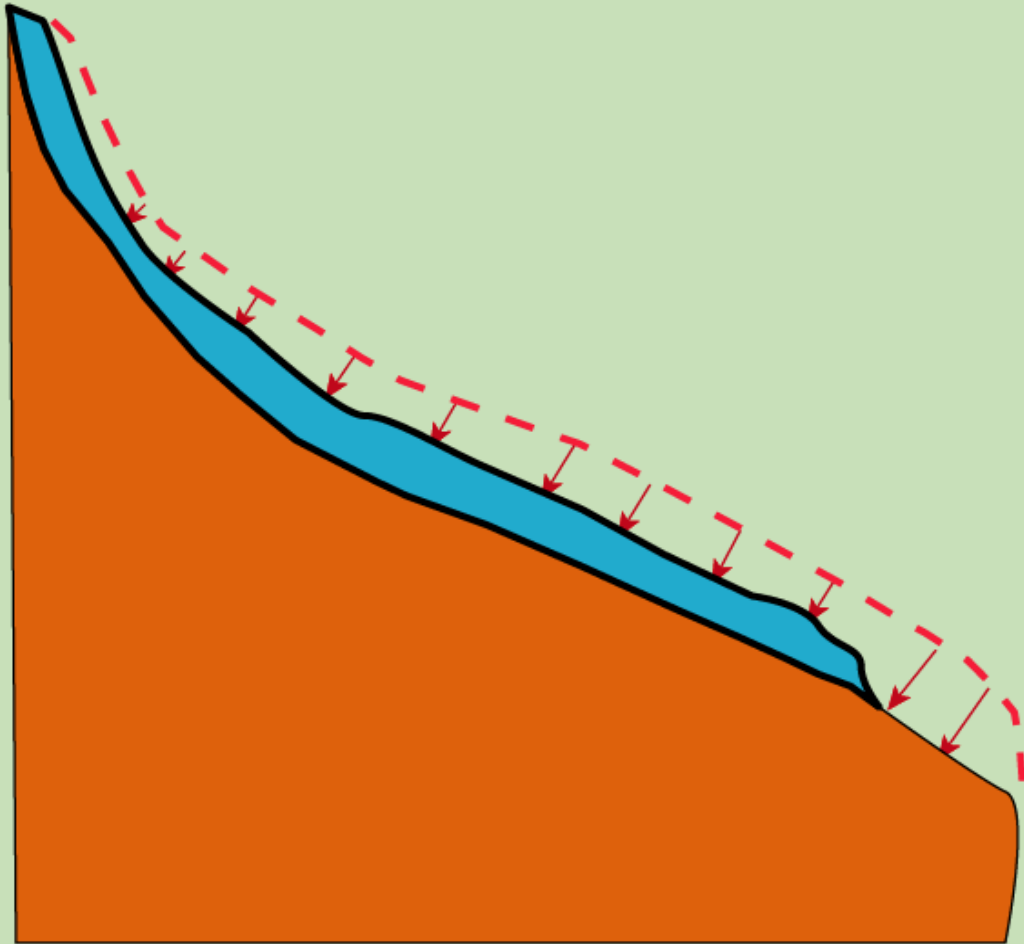
Robson Glacier (1908 - 2004)



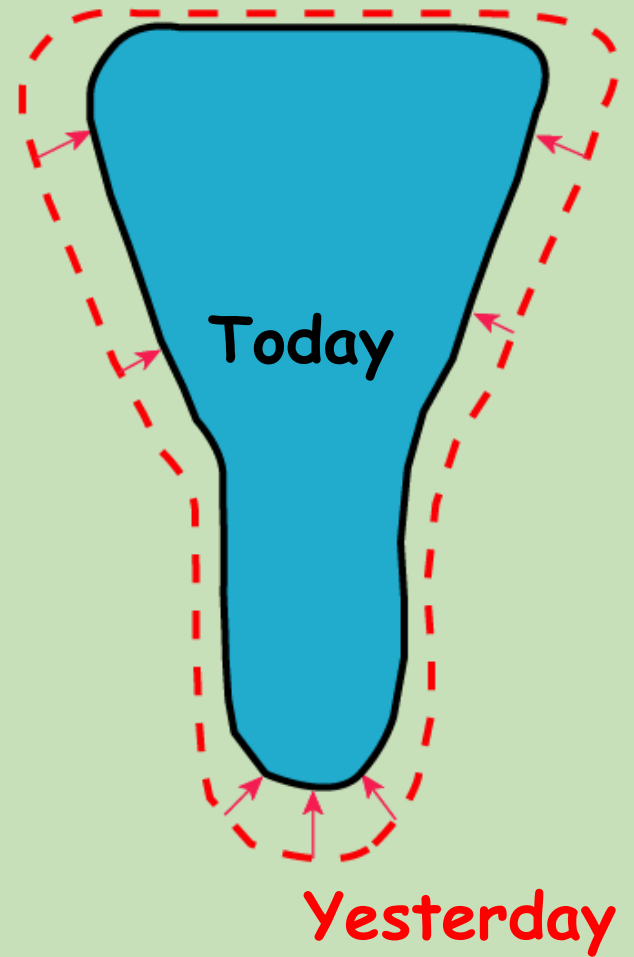
Hudson Bay Glacier, Smithers 1915-2003

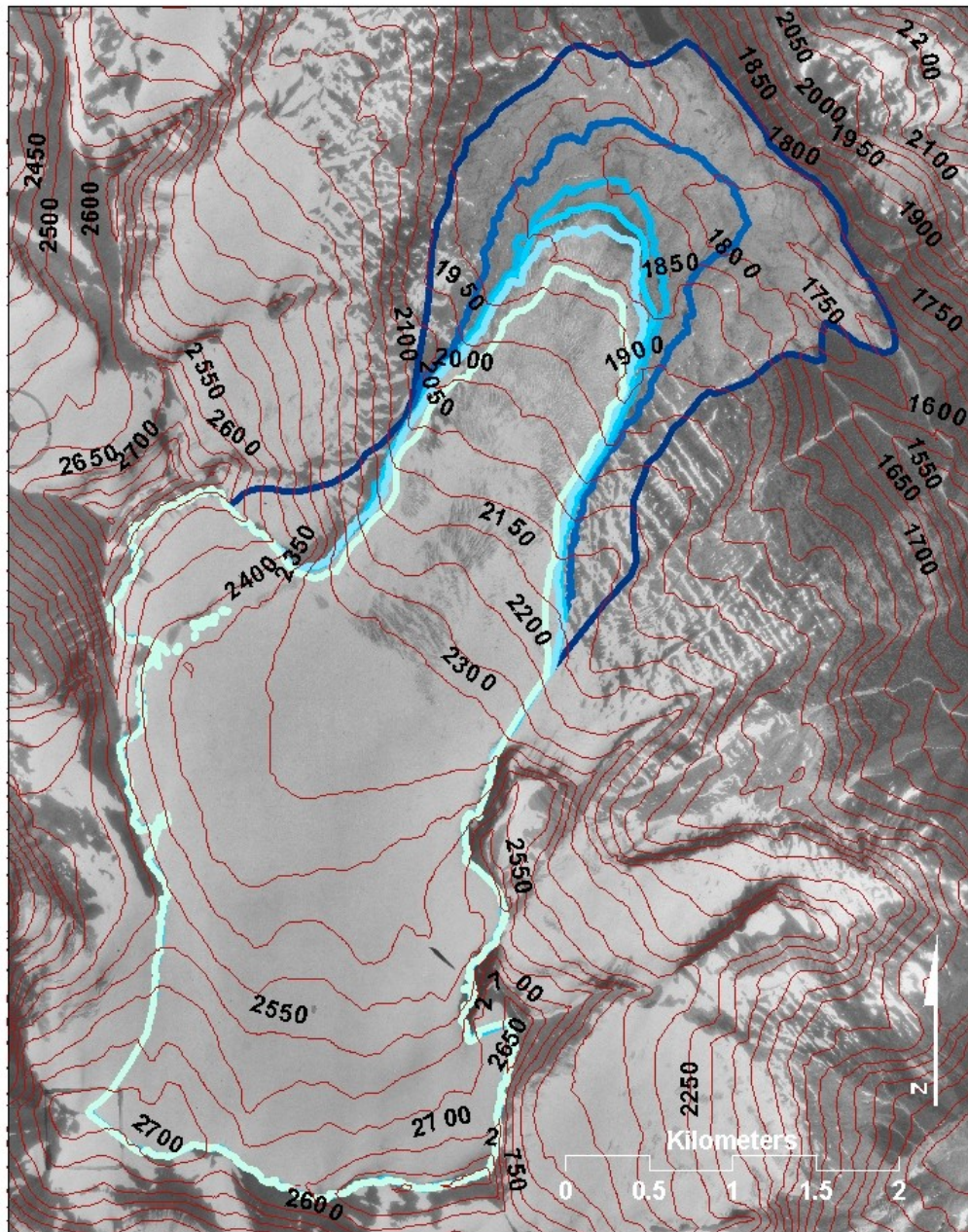


Changes in Glacier Thickness



Changes in Glacier Area





Castle Creek
Glacier
Area Change
Little Ice Age =
14.79 km²
1946 = 11.71 km²
1967 = 10.80 km²
1984 = 10.69 km²
1991 = 10.42 km²
2004 = 9.91 km²

Castle Creek Glacier

(push moraines visible in forefield)



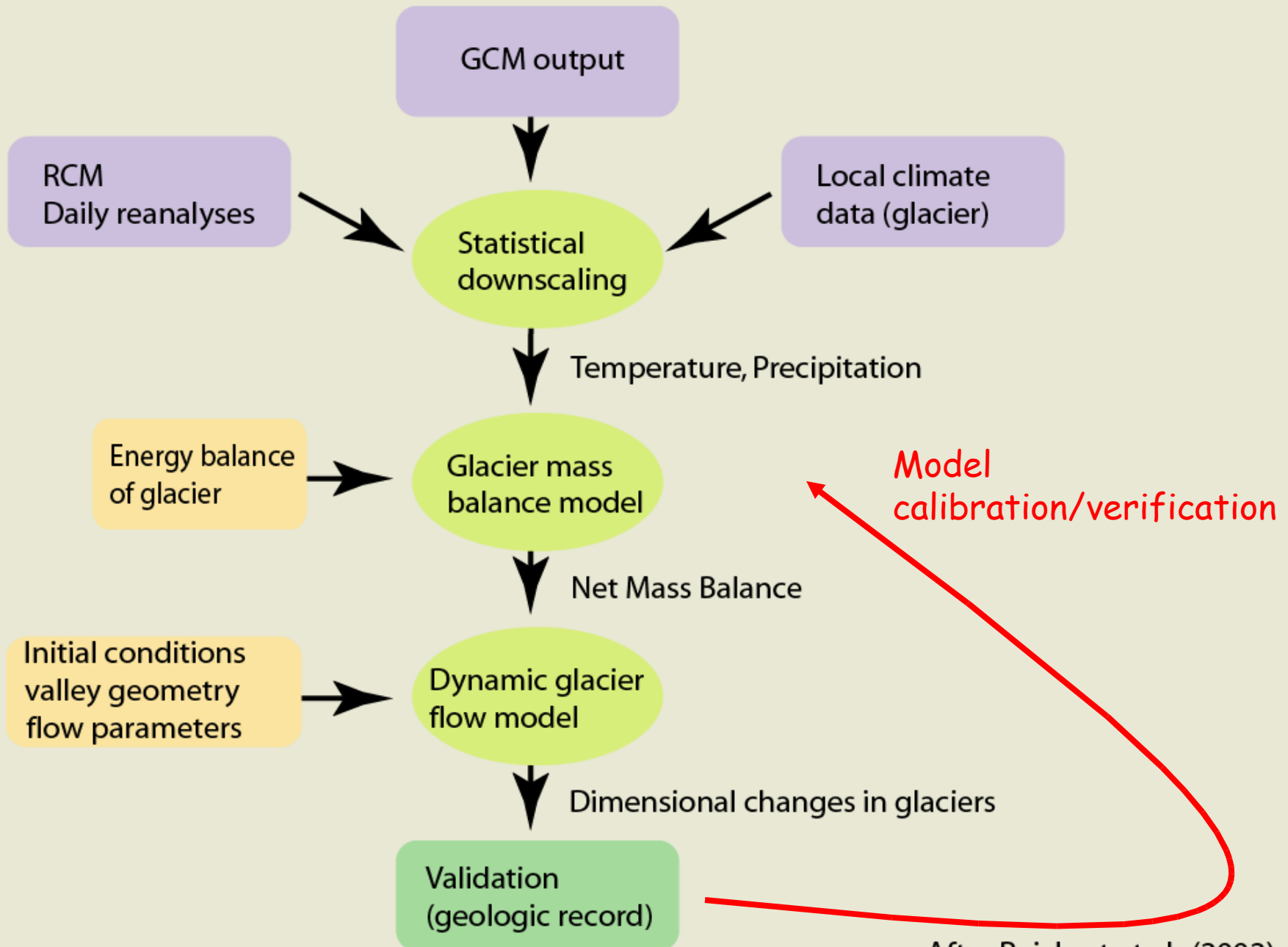
North Pacific Climate Variability



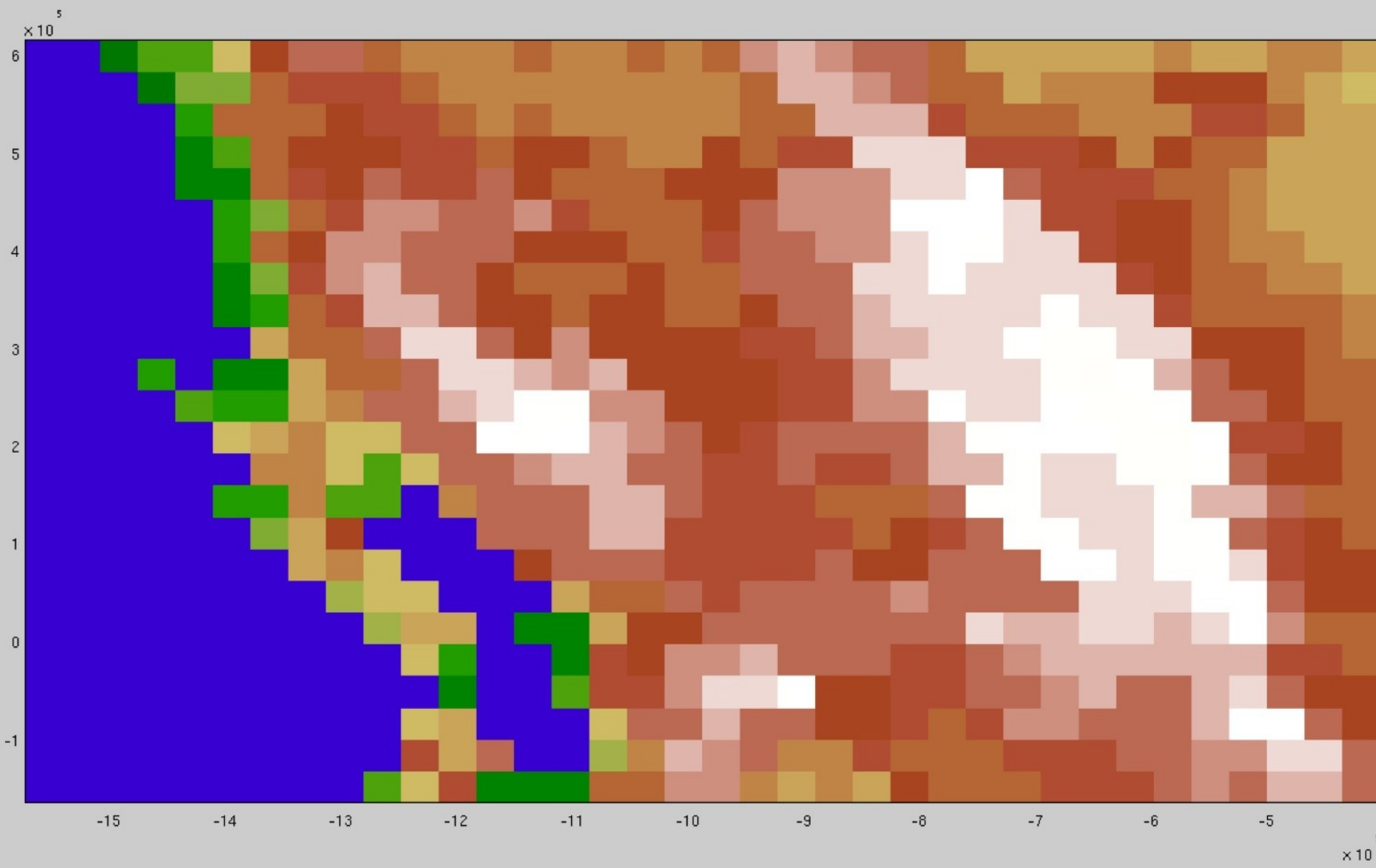
Ice-core drilling

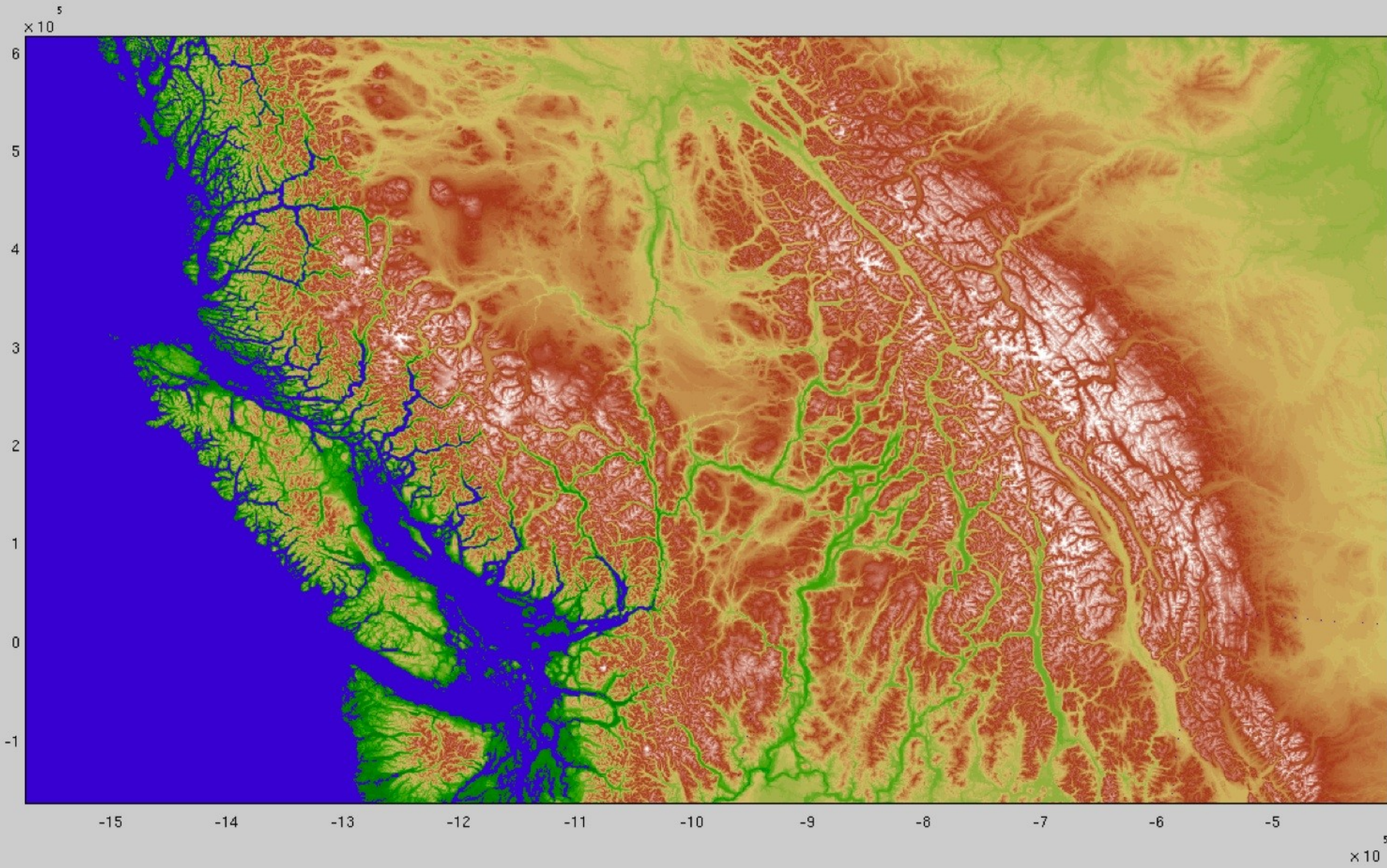


Collecting tree-ring data

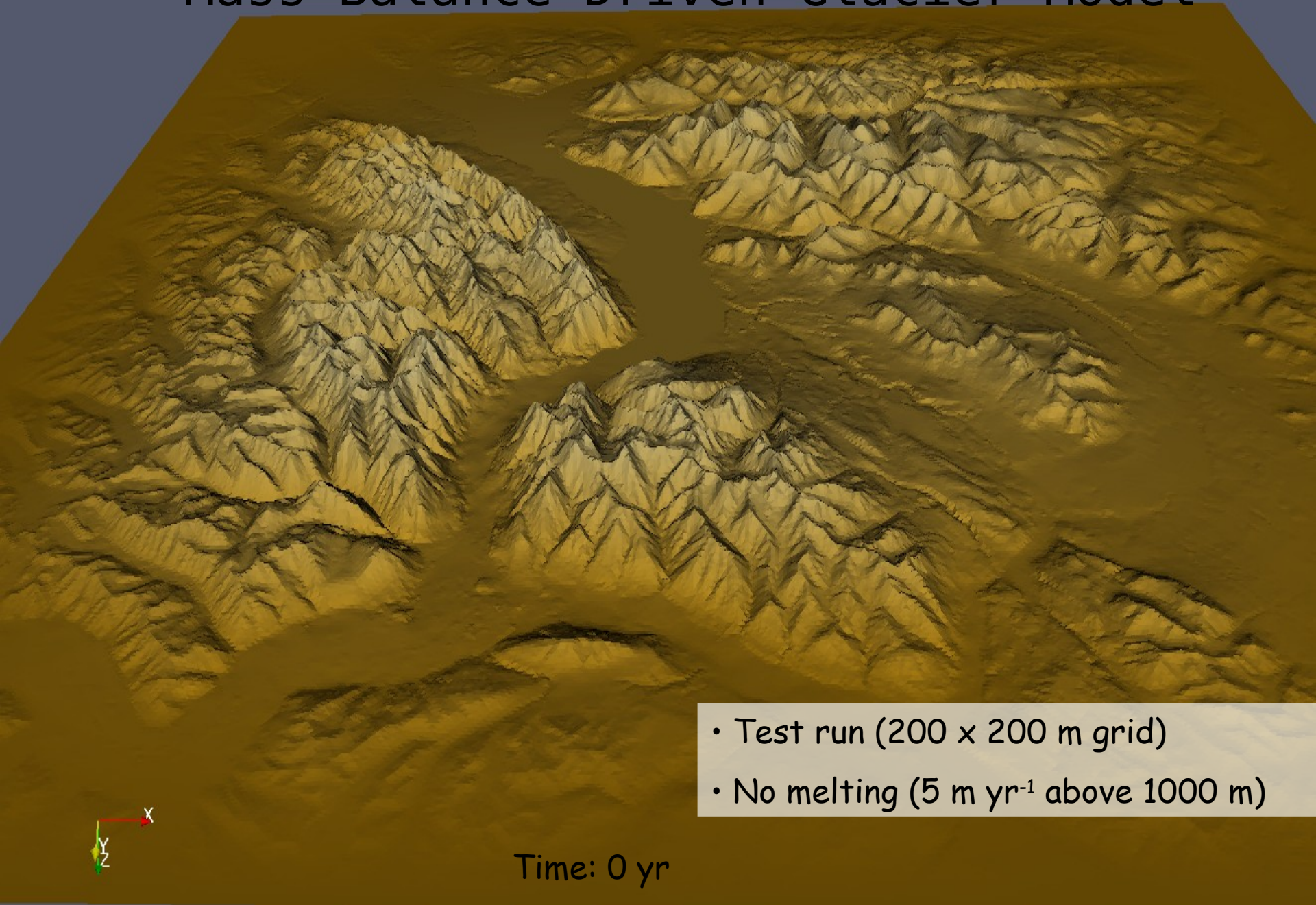


After Reichert et al., (2002)





Mass Balance Driven Glacier Model

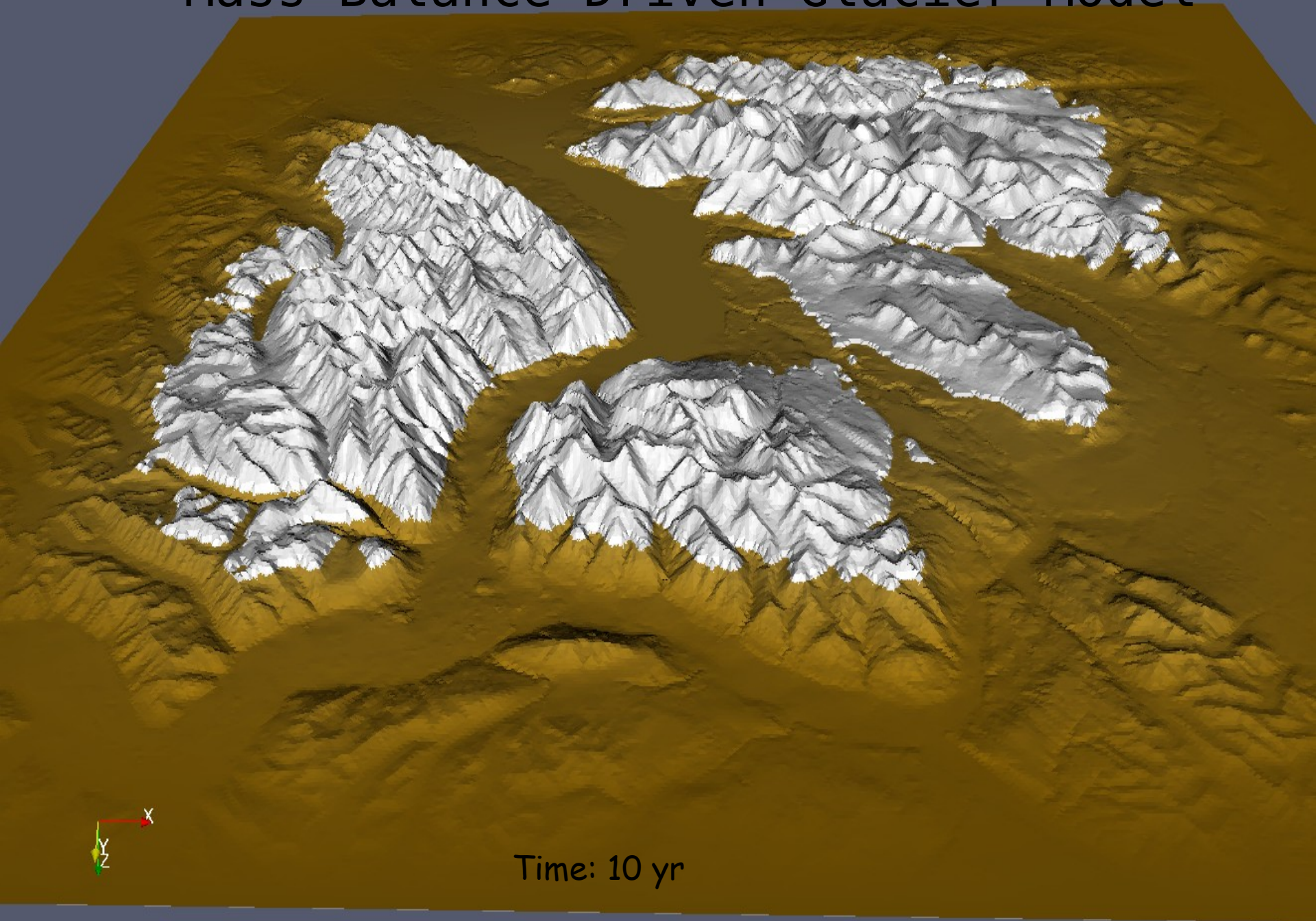


- Test run (200 x 200 m grid)
- No melting (5 m yr^{-1} above 1000 m)

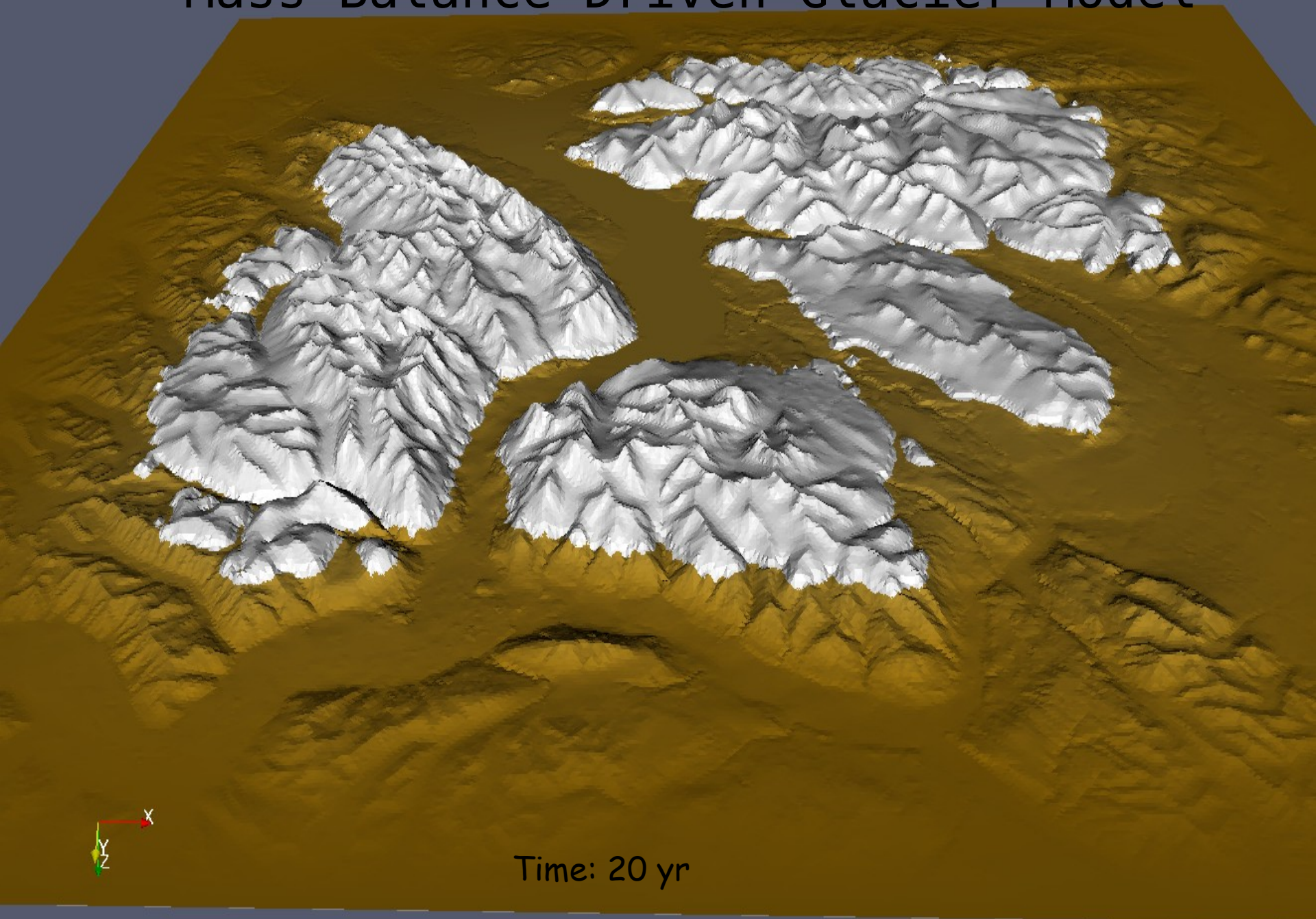


Time: 0 yr

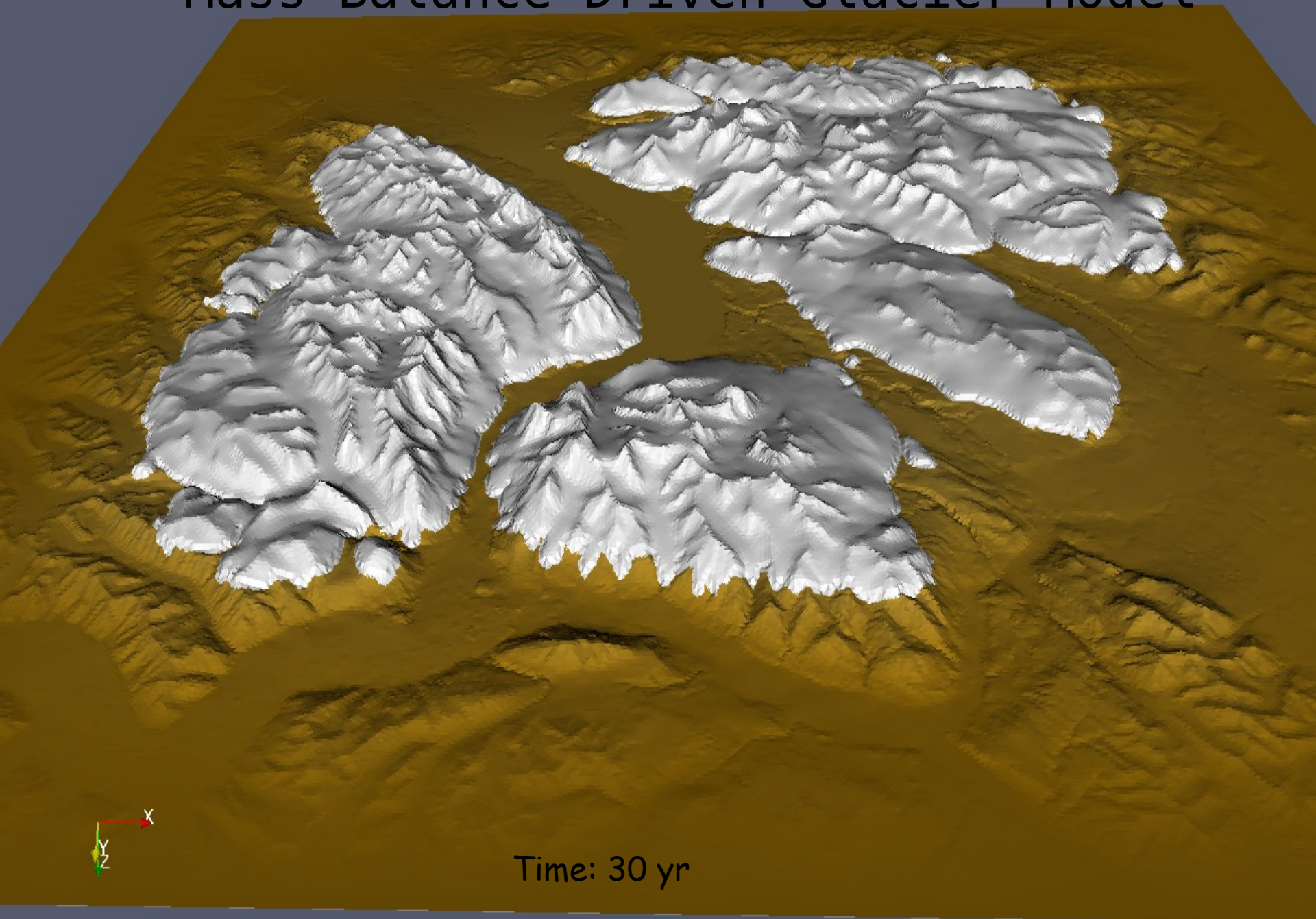
Mass Balance Driven Glacier Model



Mass Balance Driven Glacier Model

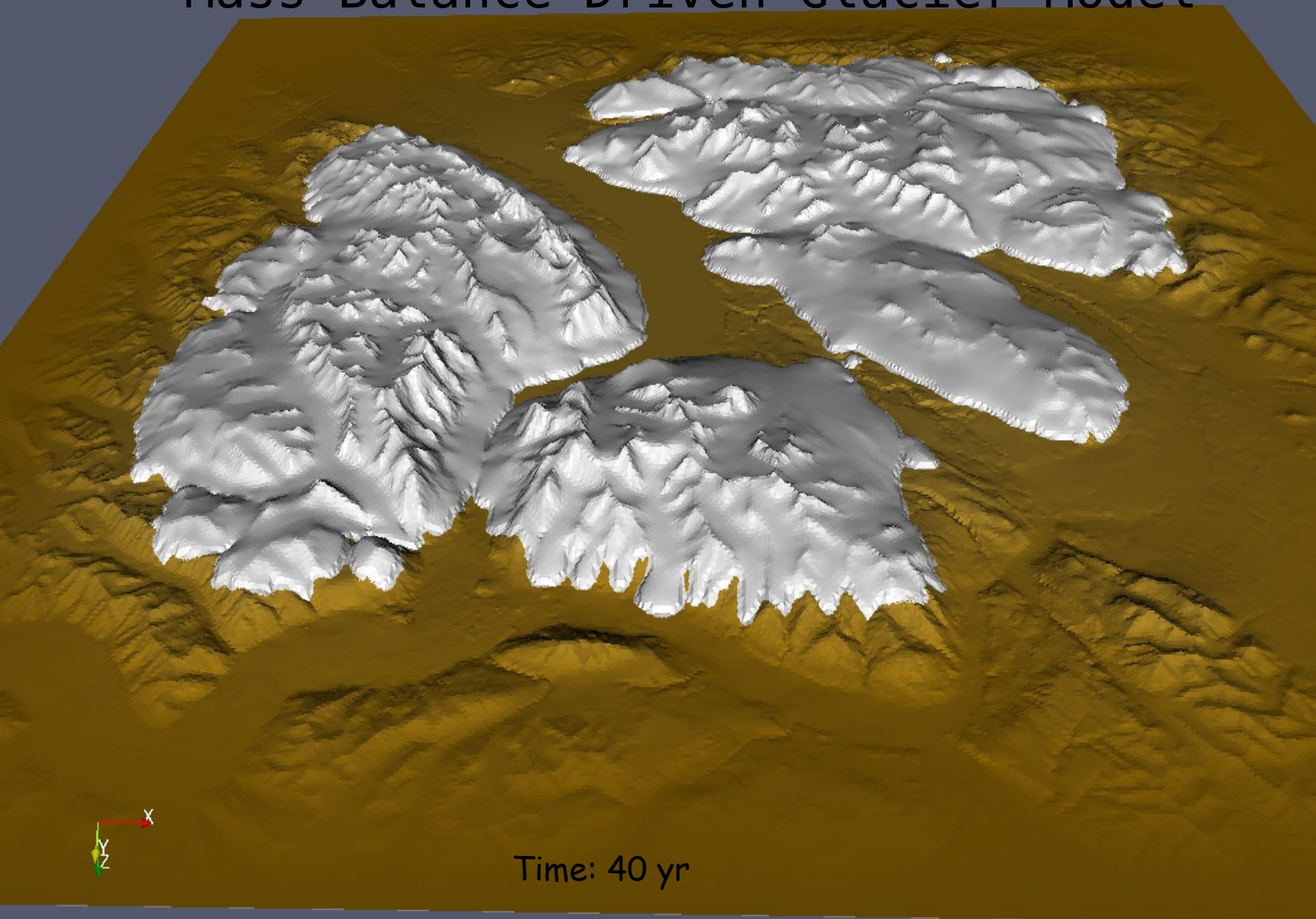


Mass Balance Driven Glacier Model



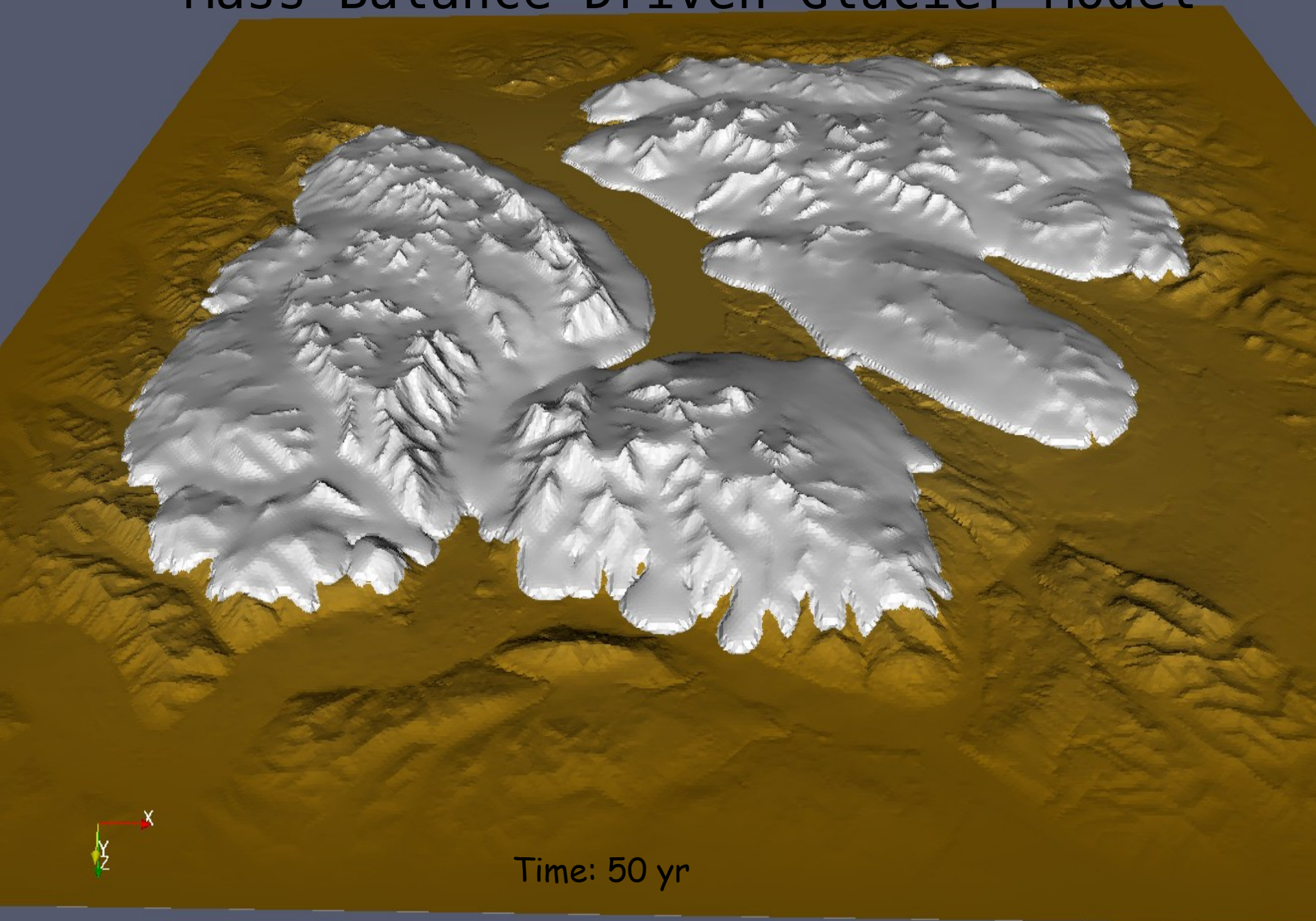
Time: 30 yr

Mass Balance Driven Glacier Model

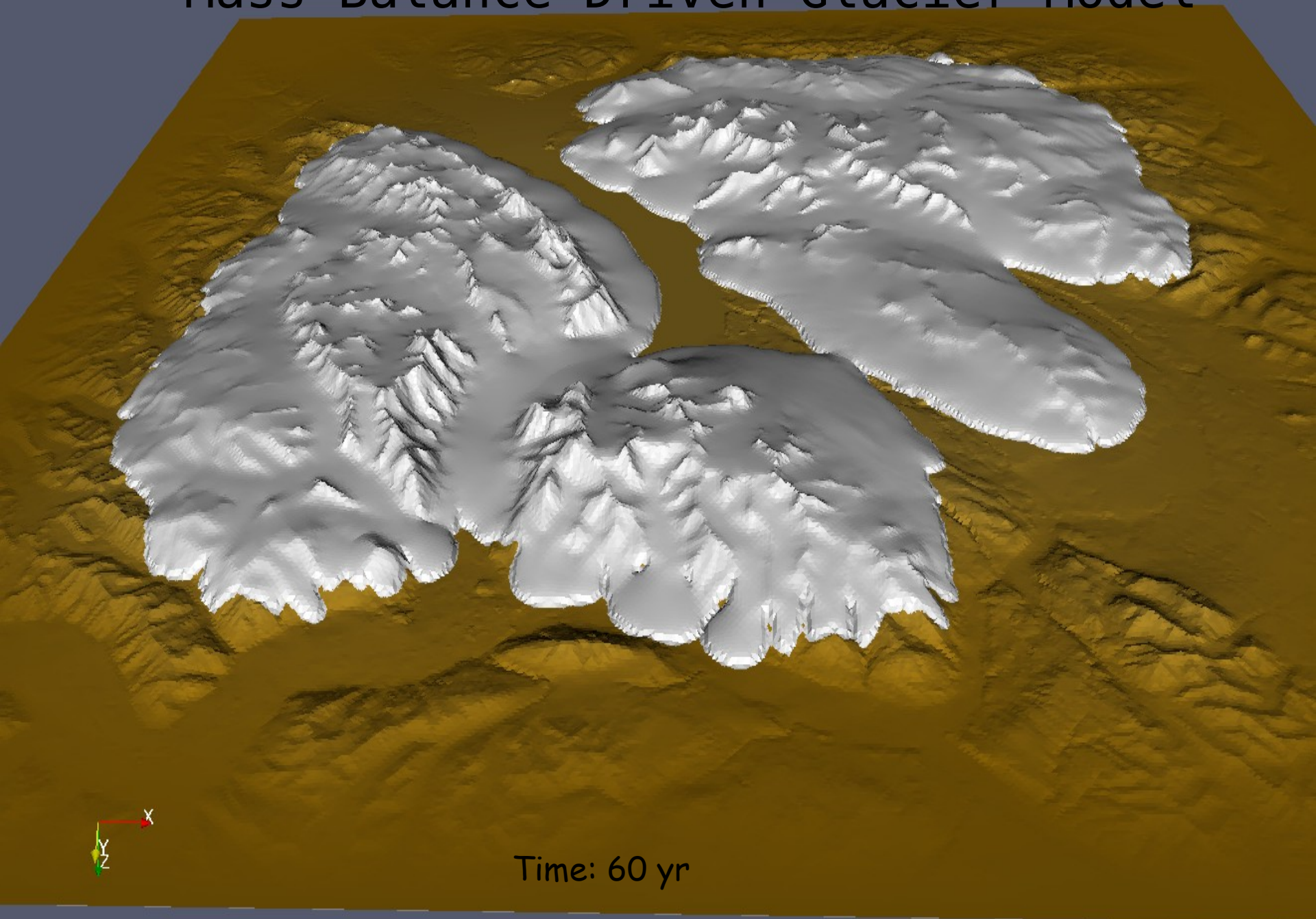


Time: 40 yr

Mass Balance Driven Glacier Model

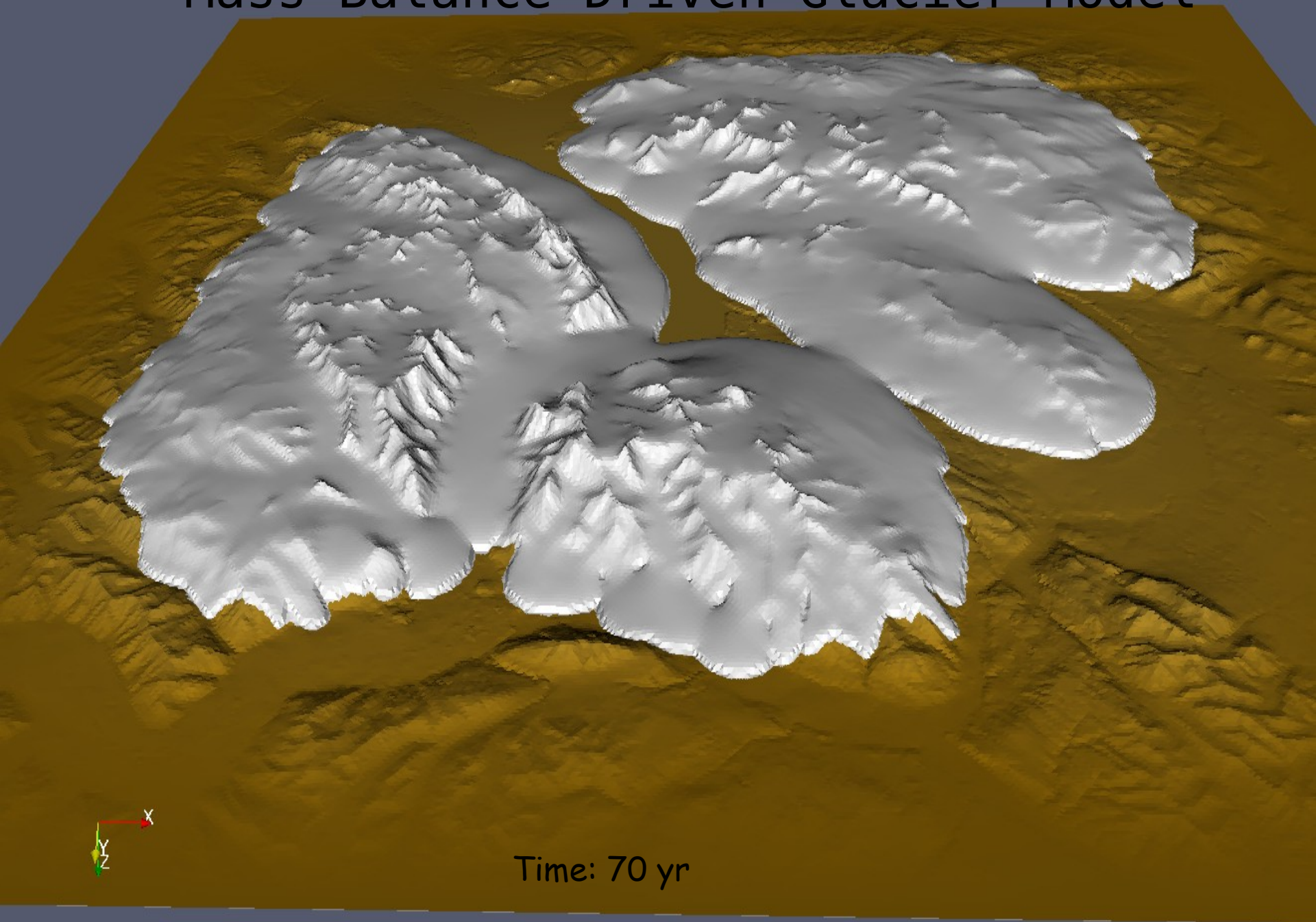


Mass Balance Driven Glacier Model

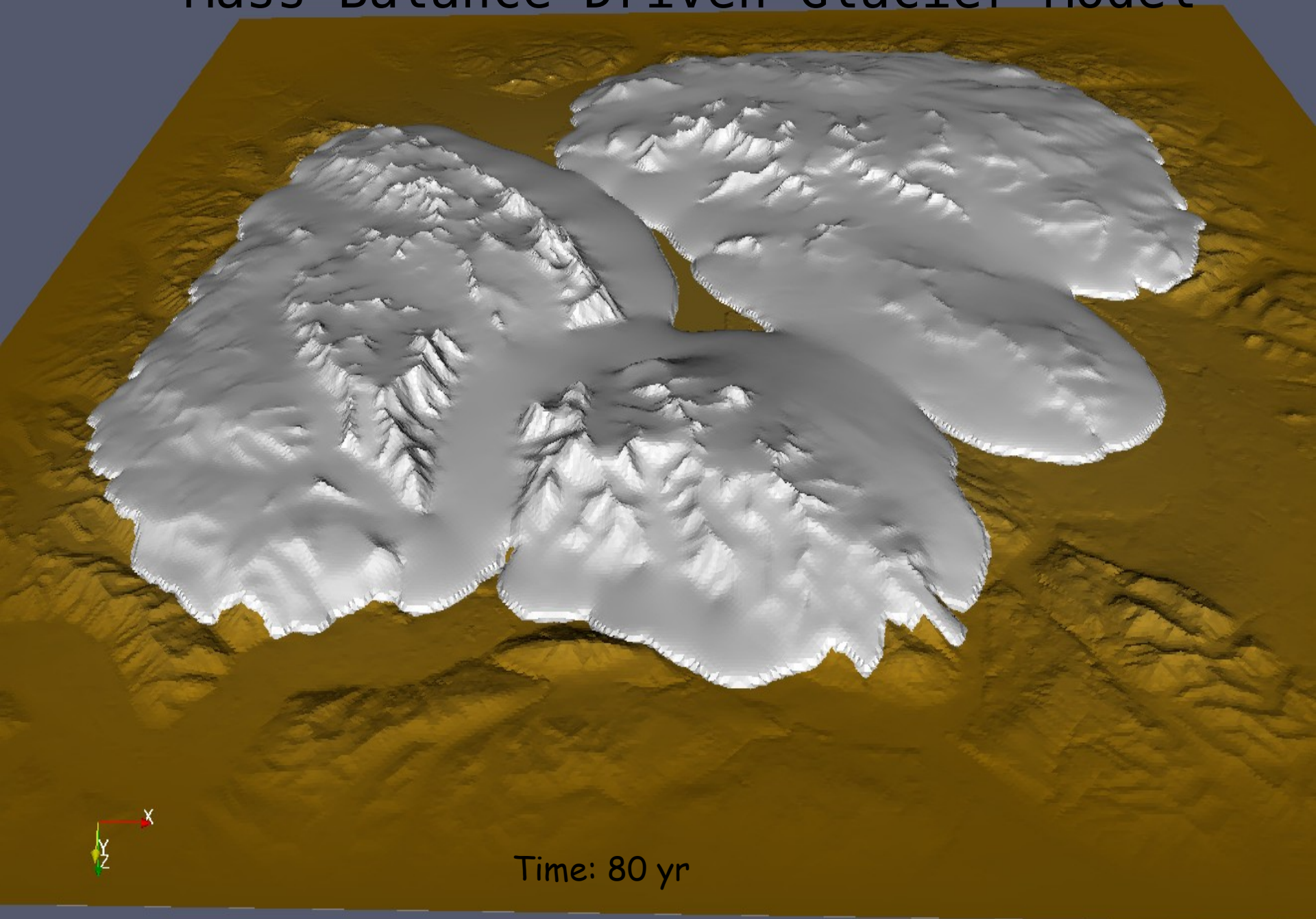


Time: 60 yr

Mass Balance Driven Glacier Model



Mass Balance Driven Glacier Model



Mass-balance data collection station Kwadacha Glacier



Mass-balance data collection Kwadacha Glacier



Mass-balance data collection Kwadacha Glacier



Mass-balance data collection at Kviteseid Glacier



QuickTime[®] and a
decompressor
are needed to see this picture.

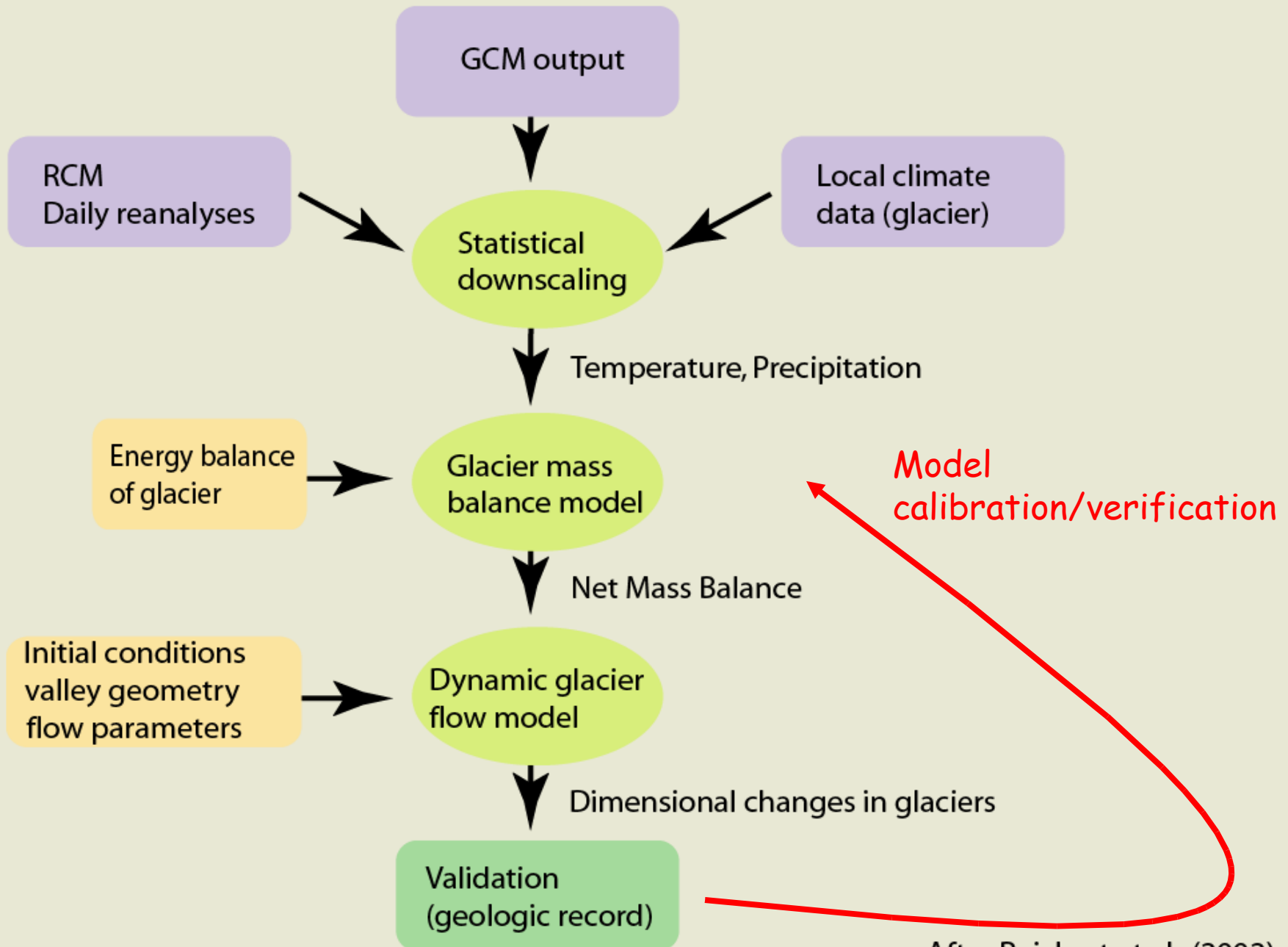
Dan Moore (UBC)

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decompressor
are needed to see this picture.

Dan Moore (UBC)



After Reichert et al., (2002)



Western Canadian Cryospheric Network

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- WC²N network partners contributing cash and in-kind support
 - UNBC, U. of Alberta, U. Vic, UBC
 - BC Hydro
 - Columbia Basin Trust
 - BC Government
 - Env. Canada / Parks Canada



Natural Resources
Canada

Ressources naturelles
Canada

