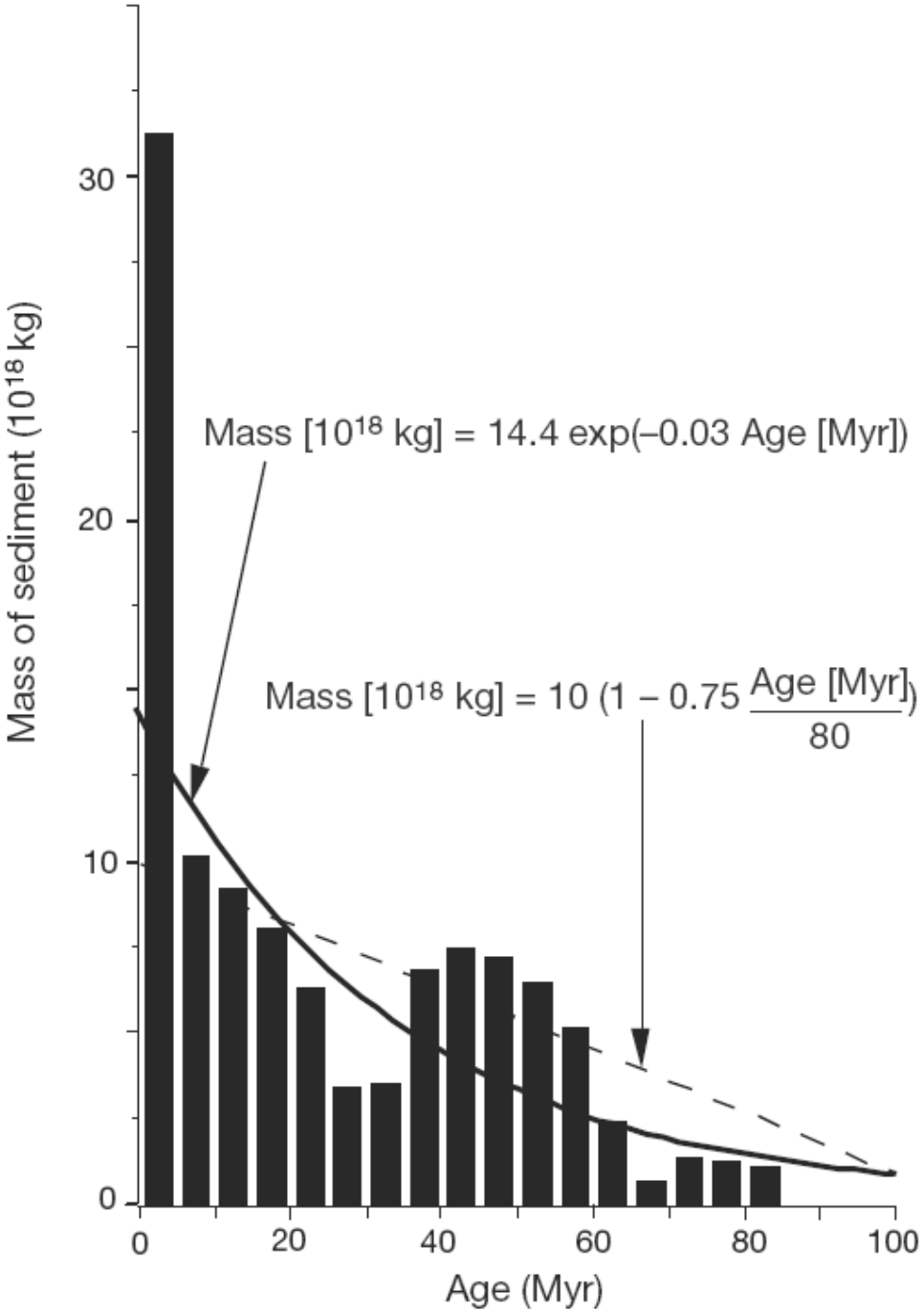
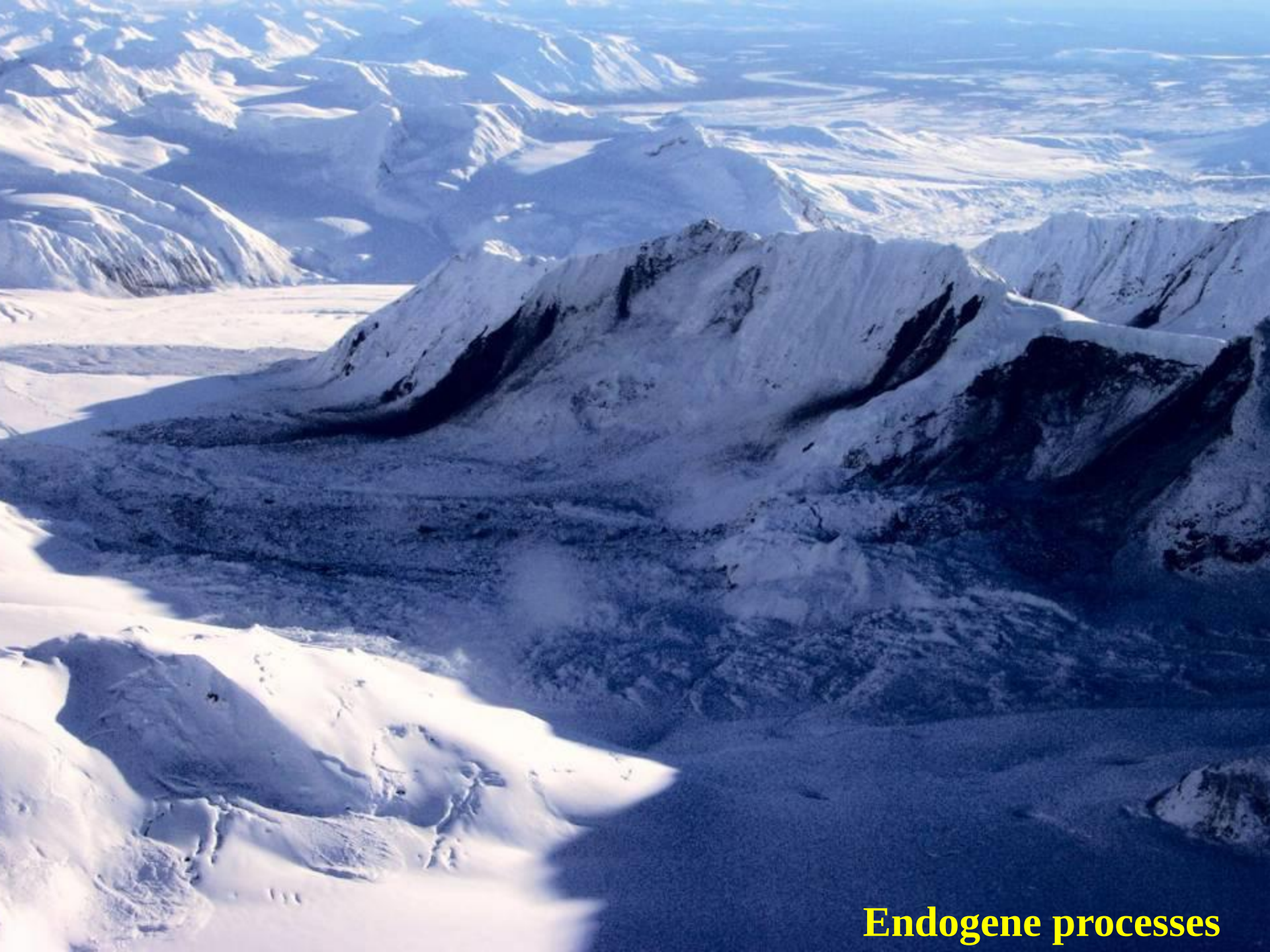

GEG 2110
Geomorphological processes


Mass of sediment (10^{18} kg)
30
20
10
0
0
20
40
60
80
100
Age (Myr)
Mass [10^{18} kg] = 14.4 exp(–0.03 Age [Myr])
Mass [10^{18} kg] = 10 (1 – 0.75 $\frac{\text{Age [Myr]}}{80}$)

Geocryology

Processes


Antropogene processes


Endogene processes


Endogene processes


Exogene processes (climatic)


Exogene processes (climatic)

Landforms and processes

A geomorphological process in action

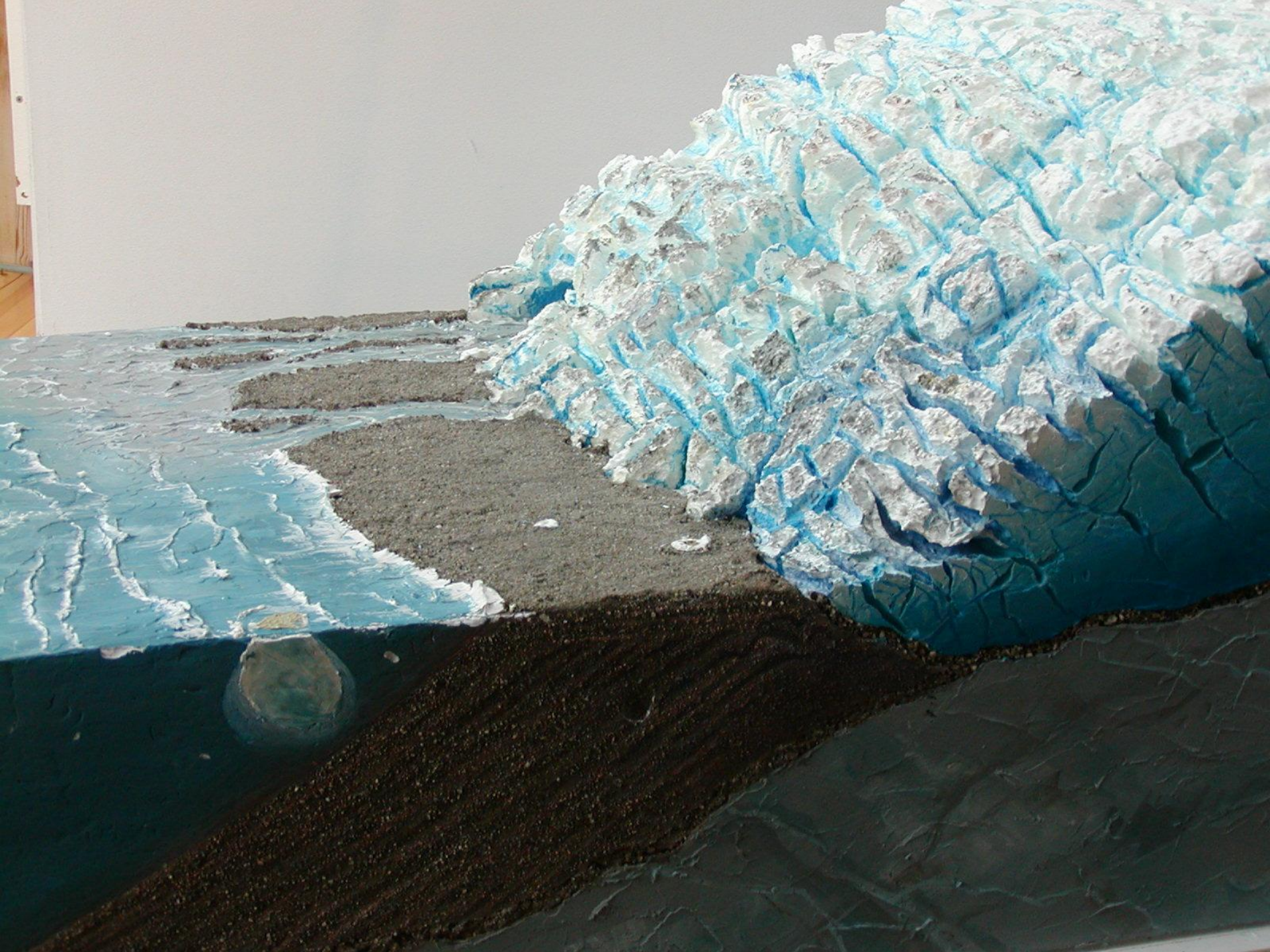

Landforms are the result of
geomorphological processes

Landforms therefore indicate the action of specific geomorphological processes

Periglacial processes

Glacial processes


The action of solid water




NORGE


Palaeoclimate

Fluvial processes

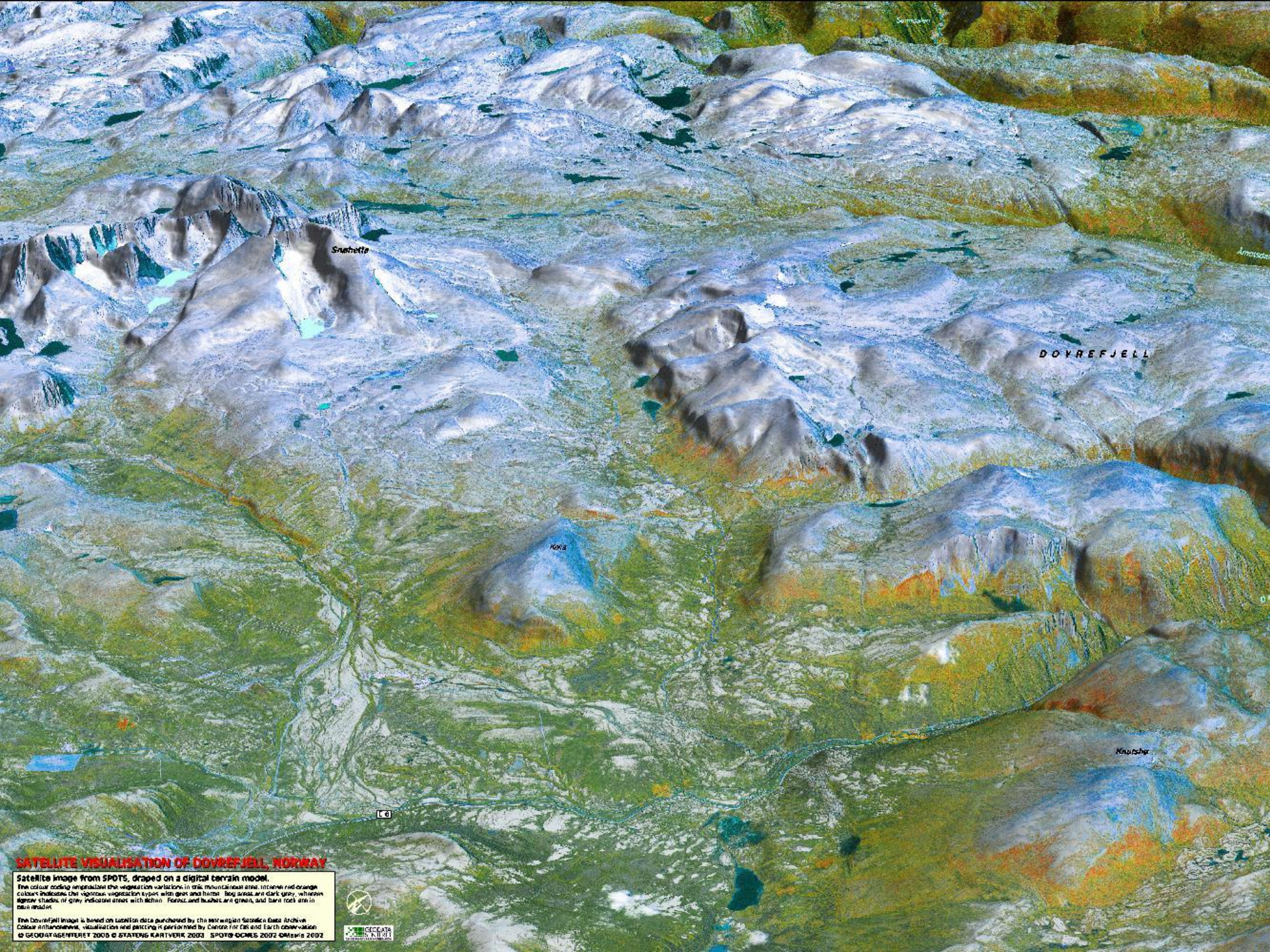

The action of liquid water

Glacial versus periglacial


Trimline

Glaciation, periglaciation and permafrost


.....glaciation level.....
.....lower **permafrost** limit.....
.....upper treeline = lower periglacial limit.....

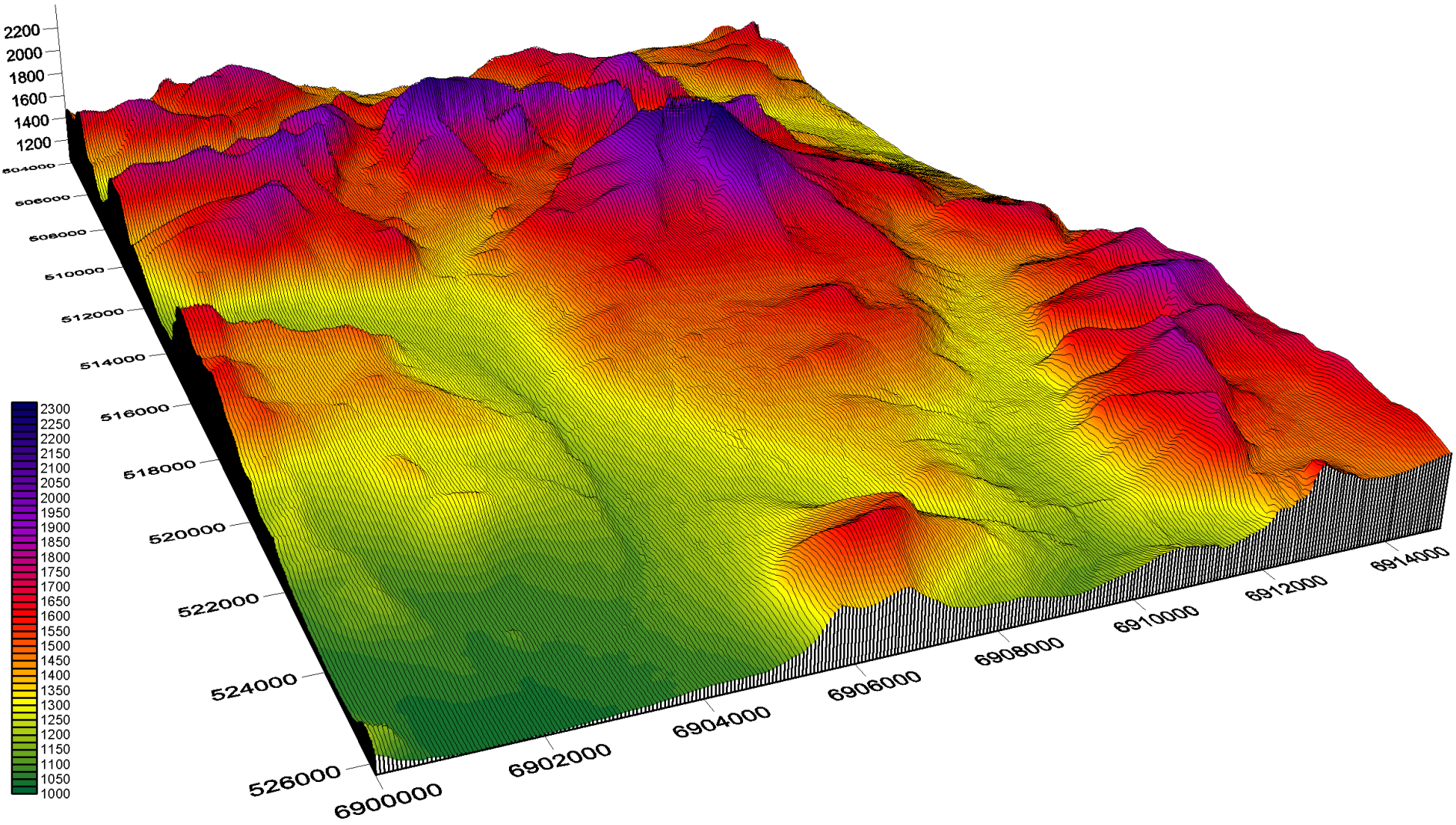


SATELLITE VISUALISATION OF DOVREFJELL, NORWAY

Satellite image from SPOT5, draped on a digital terrain model.

The colour coding emphasizes the vegetation variations in this mountainous area. Intense red-orange colours indicates the vigorous vegetation types with grass and heath. Bog areas are dark grey, whereas sparser shades of grey indicates areas with lichen. Forest and bushes are green, and bare rock are in blue shades.

The Dovrefjell image is based on satellite data purchased by the Norwegian Satellite Data Archive. Colour enhancement, visualisation and painting is performed by Centre for GIS and Earth observation.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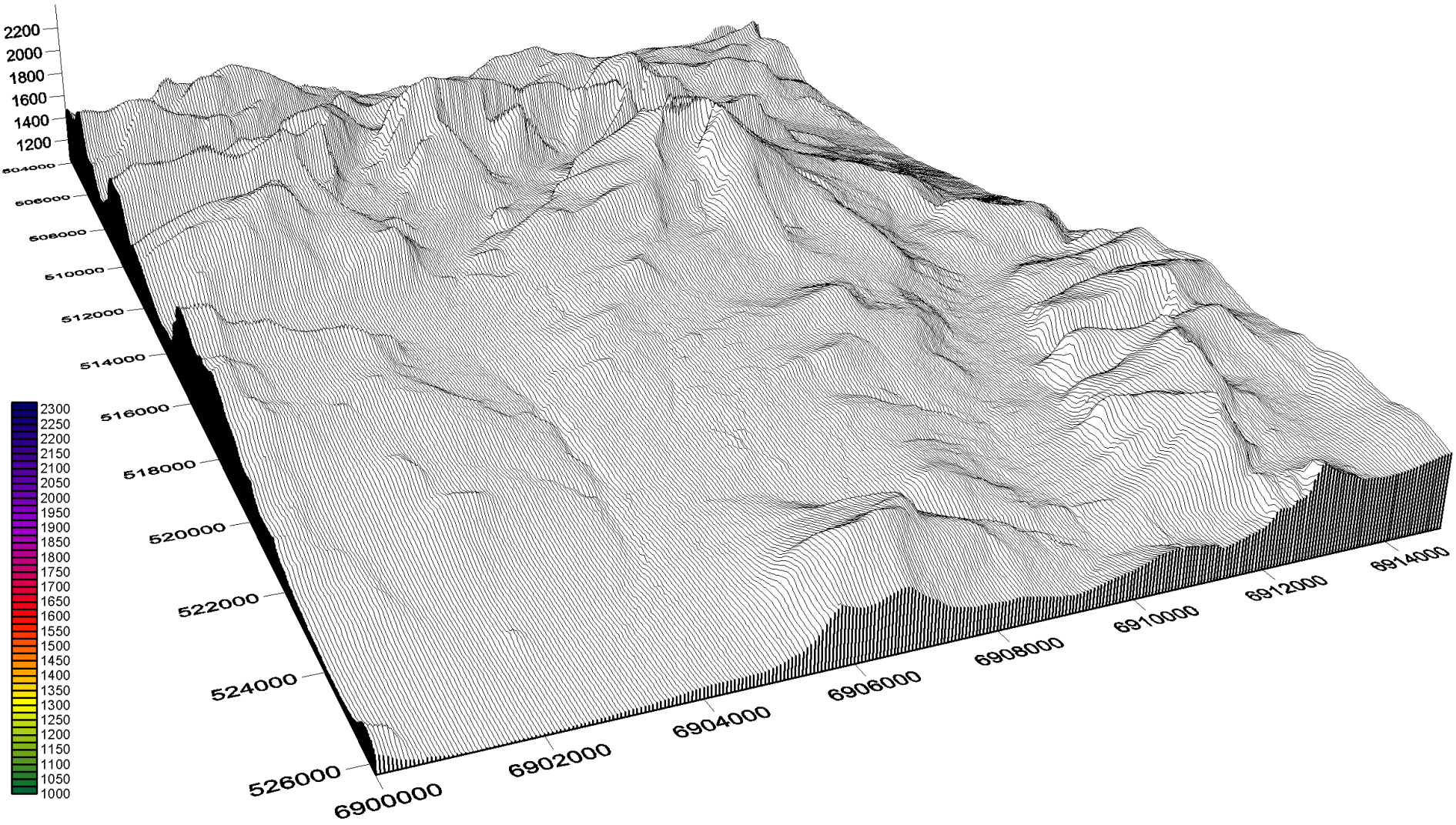
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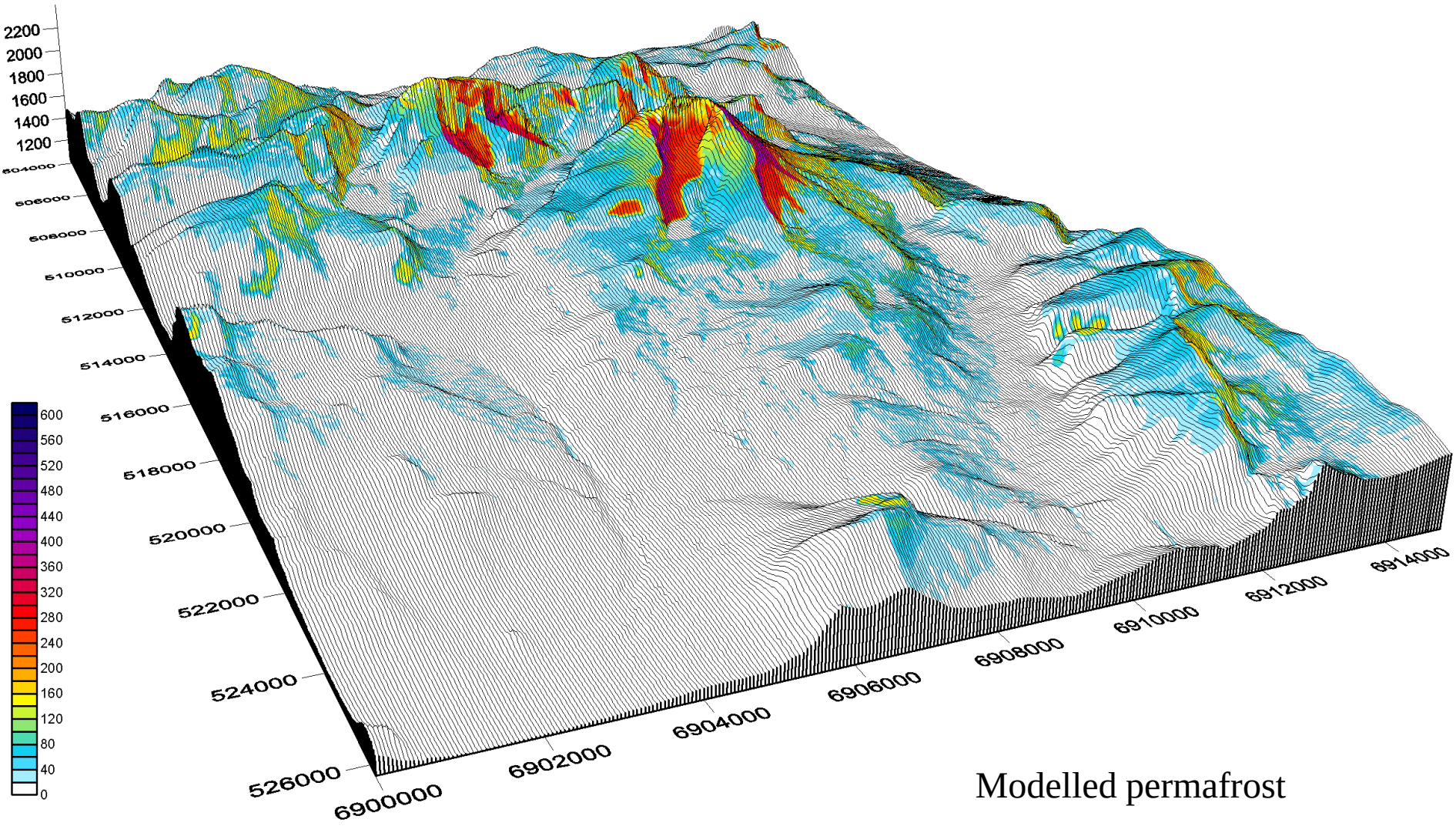


Modelled permafrost

Knowledge on geomorphic processes:

1: Background for interpreting landforms

2: Background for interpreting climate

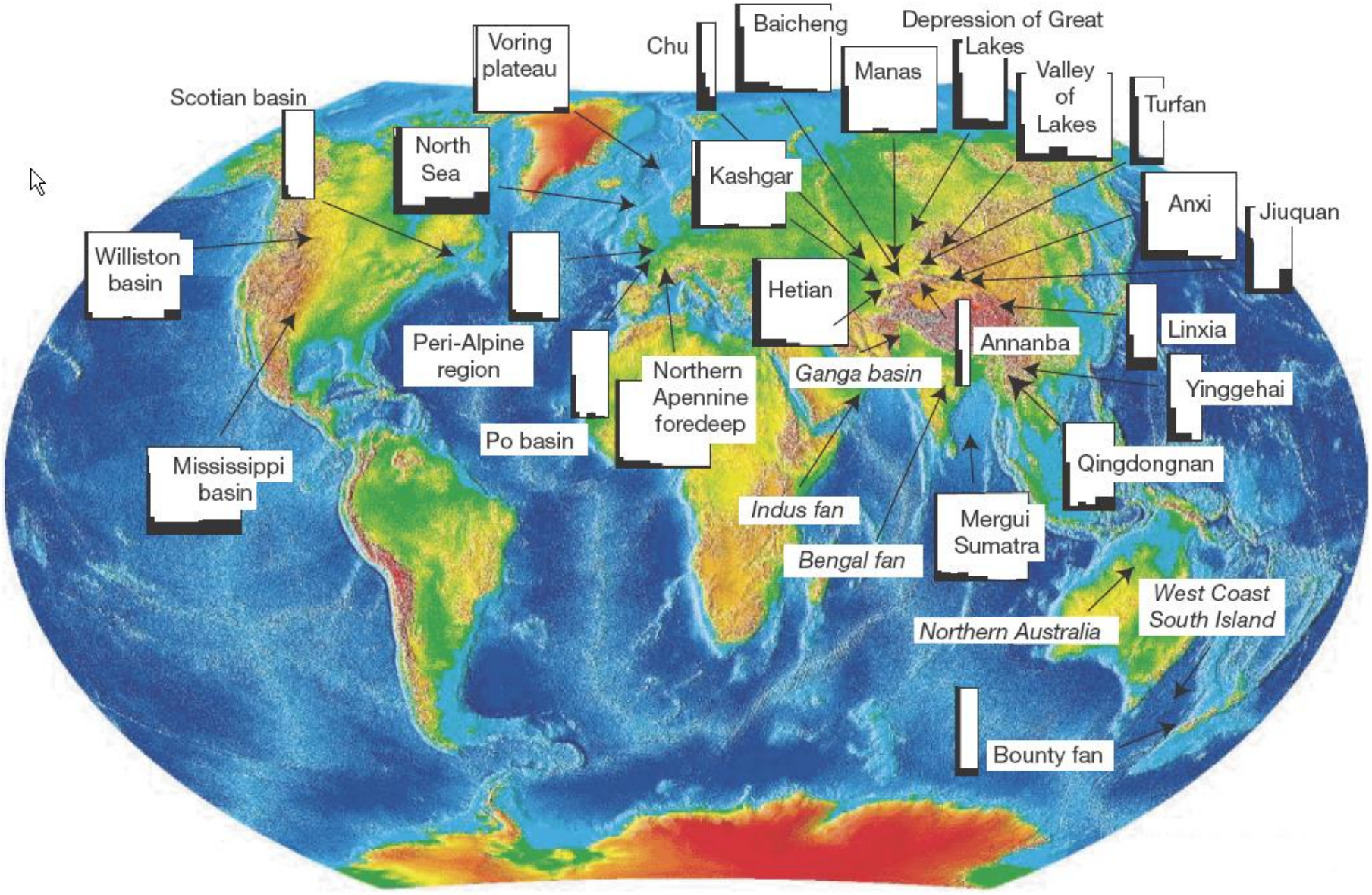
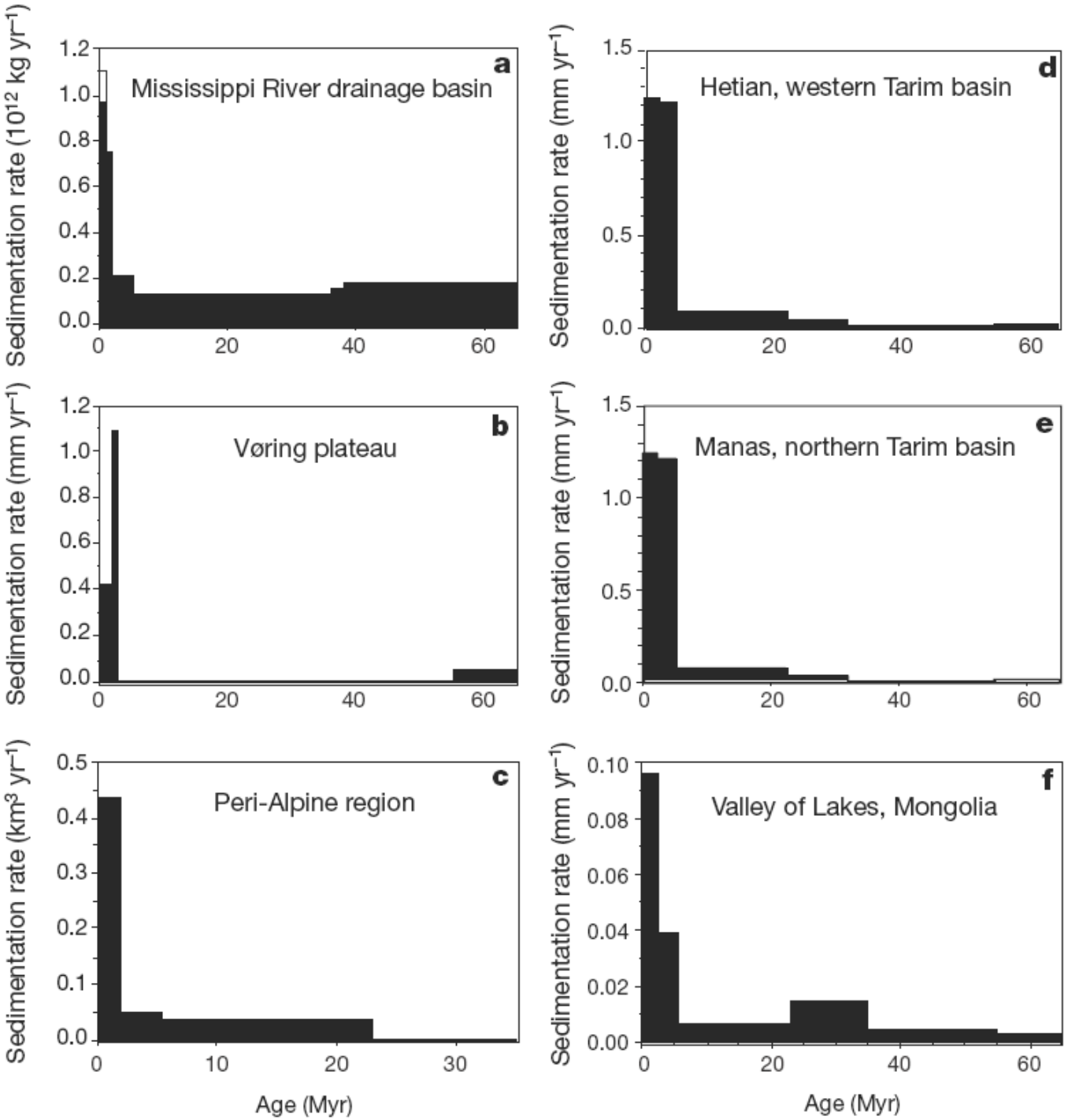
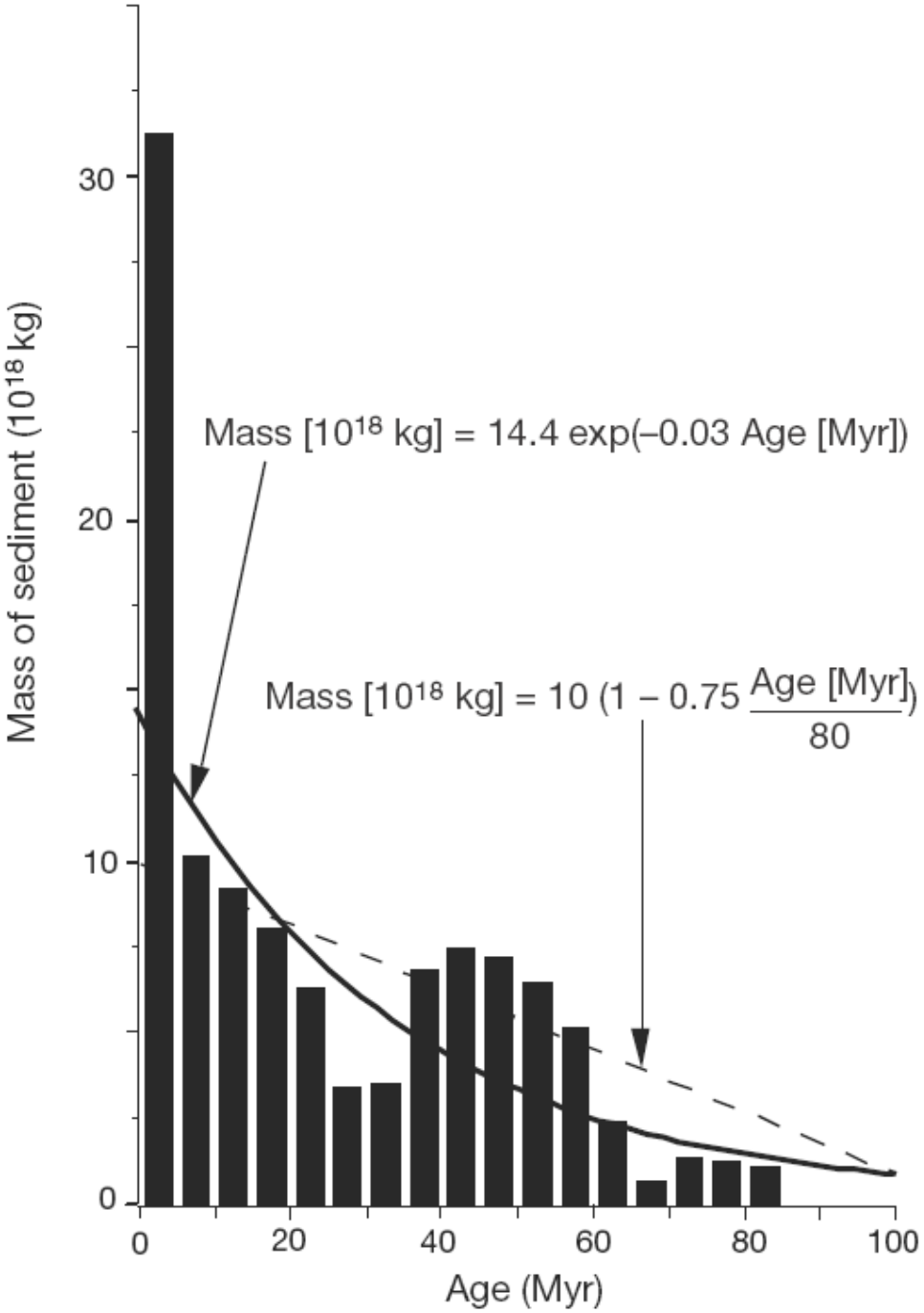


Figure 2 Map of the Earth showing selected areas where sedimentation rates have increased substantially since 2–4 Myr ago. (Details are given in Fig. 4 and Supplementary Information.) For each area, a small histogram is shown. The vertical scale is normalized to the maximum sedimentation rate in that area, and all horizontal axes are plotted at the same timescale; the longest records extend to 65 Myr ago. We show only the part of the Cenozoic for which there are measurements.


a
Mississippi River drainage basin
Sedimentation rate (10^{12} kg yr^{-1})
b
Vøring plateau
Sedimentation rate (mm yr^{-1})
c
Peri-Alpine region
Sedimentation rate (km^3 yr^{-1})
Age (Myr)
d
Hetian, western Tarim basin
Sedimentation rate (mm yr^{-1})
e
Manas, northern Tarim basin
Sedimentation rate (mm yr^{-1})
f
Valley of Lakes, Mongolia
Sedimentation rate (mm yr^{-1})
Age (Myr)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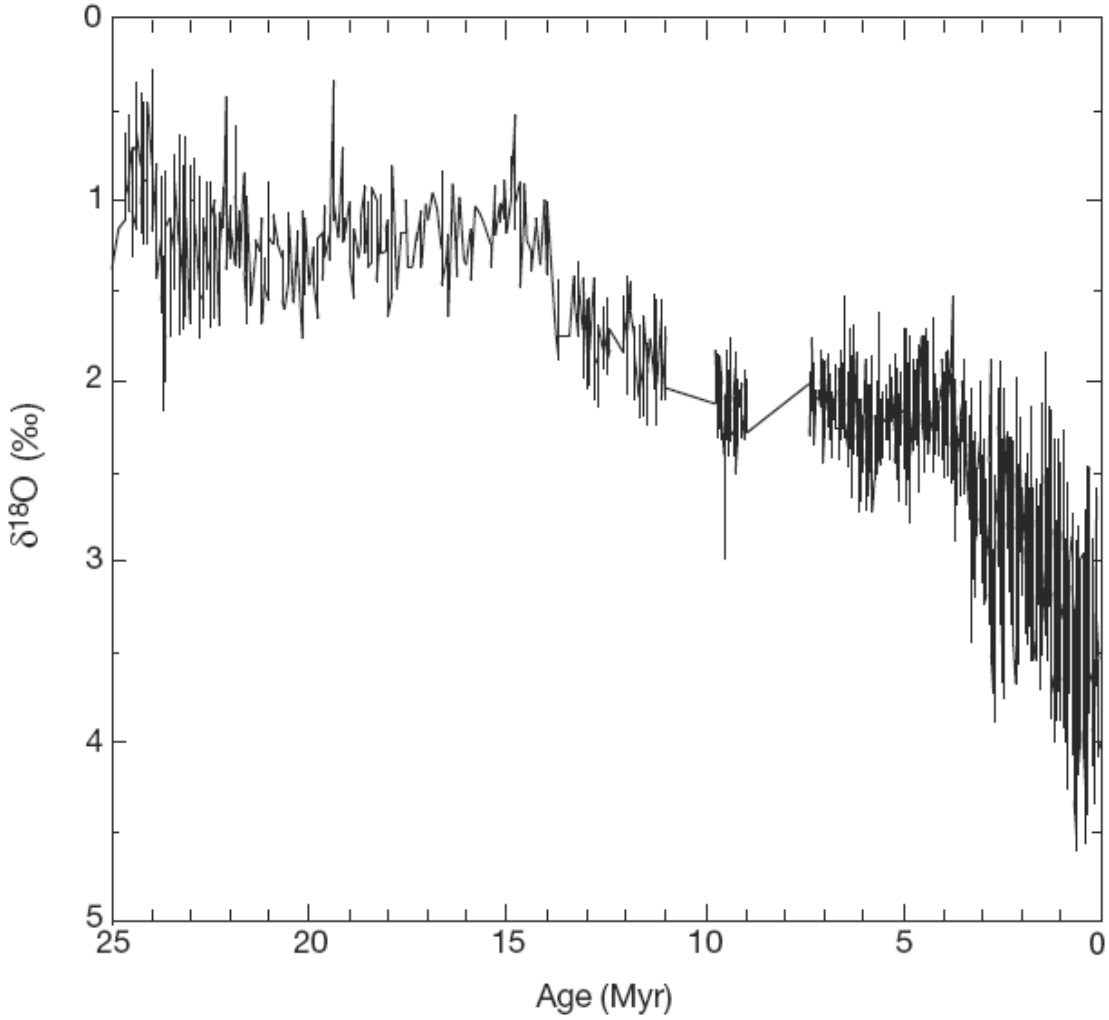
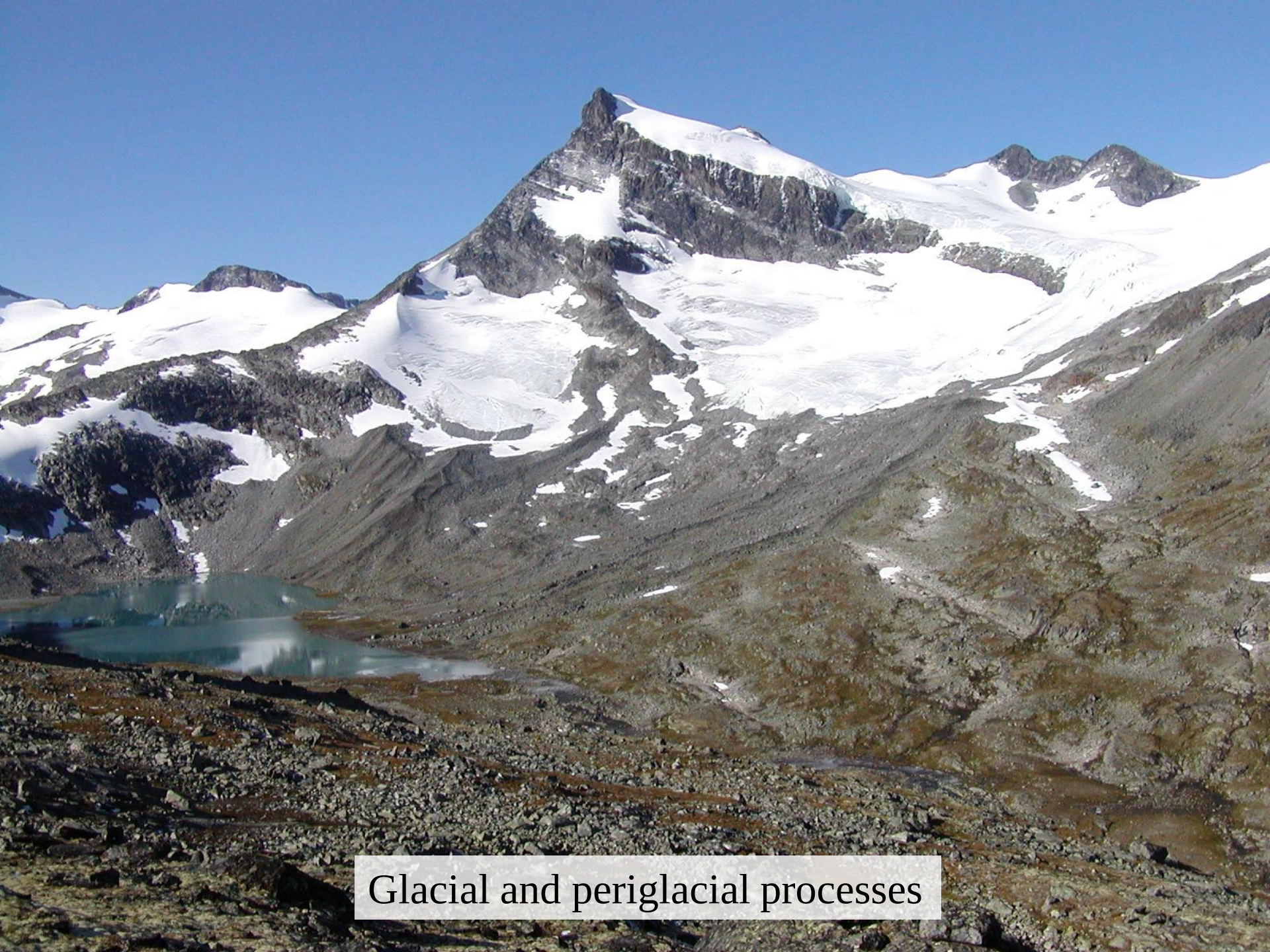


Figure 1 Plot of $\delta^{18}O$ from benthic foraminifers since 25 Myr ago, showing increases in mean values and in variability since ~4 Myr ago. The former increases imply cooling, and the latter increases imply an increasingly variable climate. Values (in ‰) have been measured largely (~95%) from fossil tests of *Cibicoides* spp., or adjusted to be equivalent to those of *Cibicoides* (ref. 63), from the Ceara rise in the eastern equatorial Atlantic Ocean (Ocean Drilling Project sites 925, 926 and 926). Values are plotted increasing downwards to reflect cooling. Data are from refs 62–66, and from T. Bickert and W. B. Curry, personal communication.


Glacial and periglacial processes

Next: Climatic background