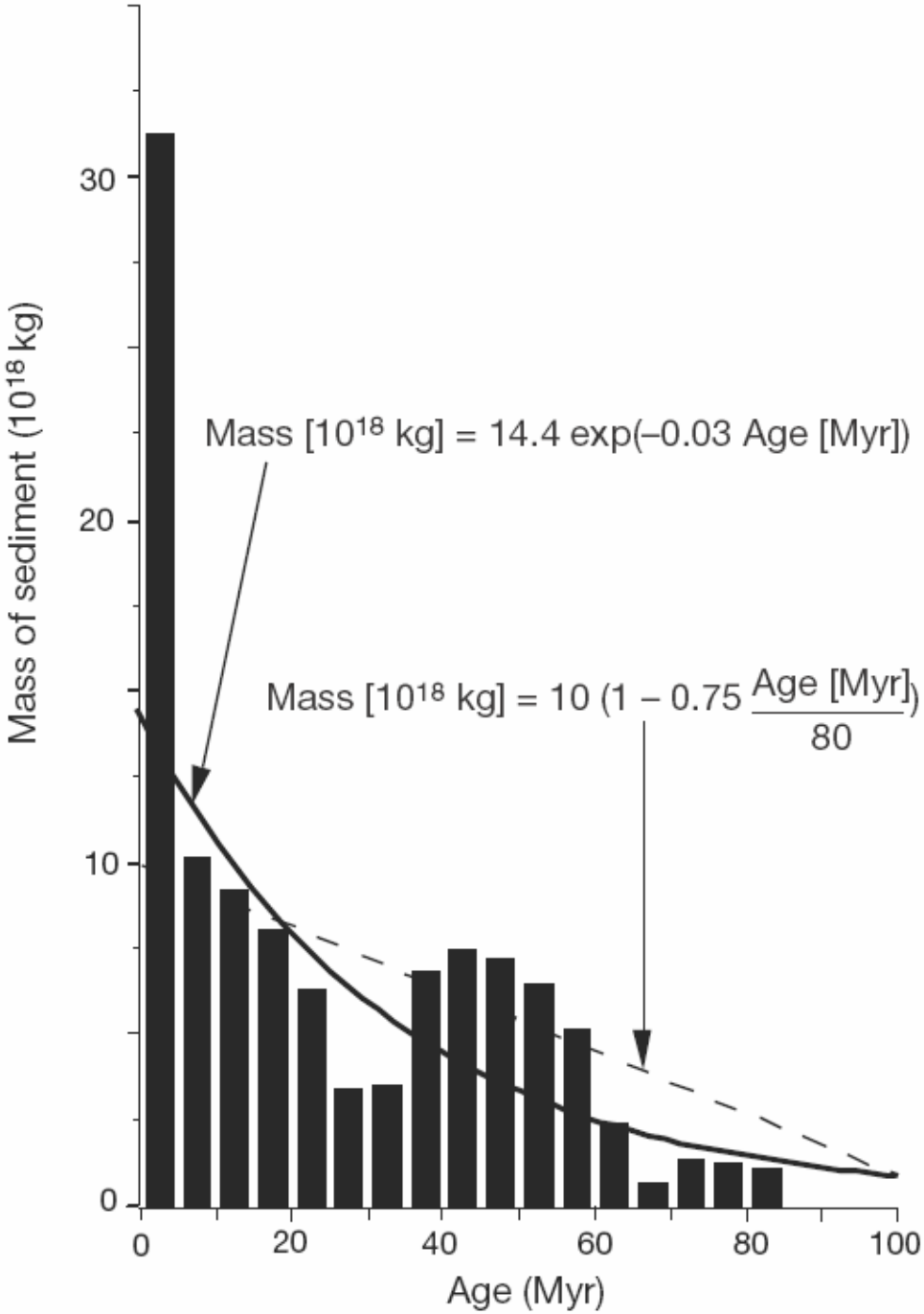
Landformdannende prosesser

GEG 2110

Geomorphic 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

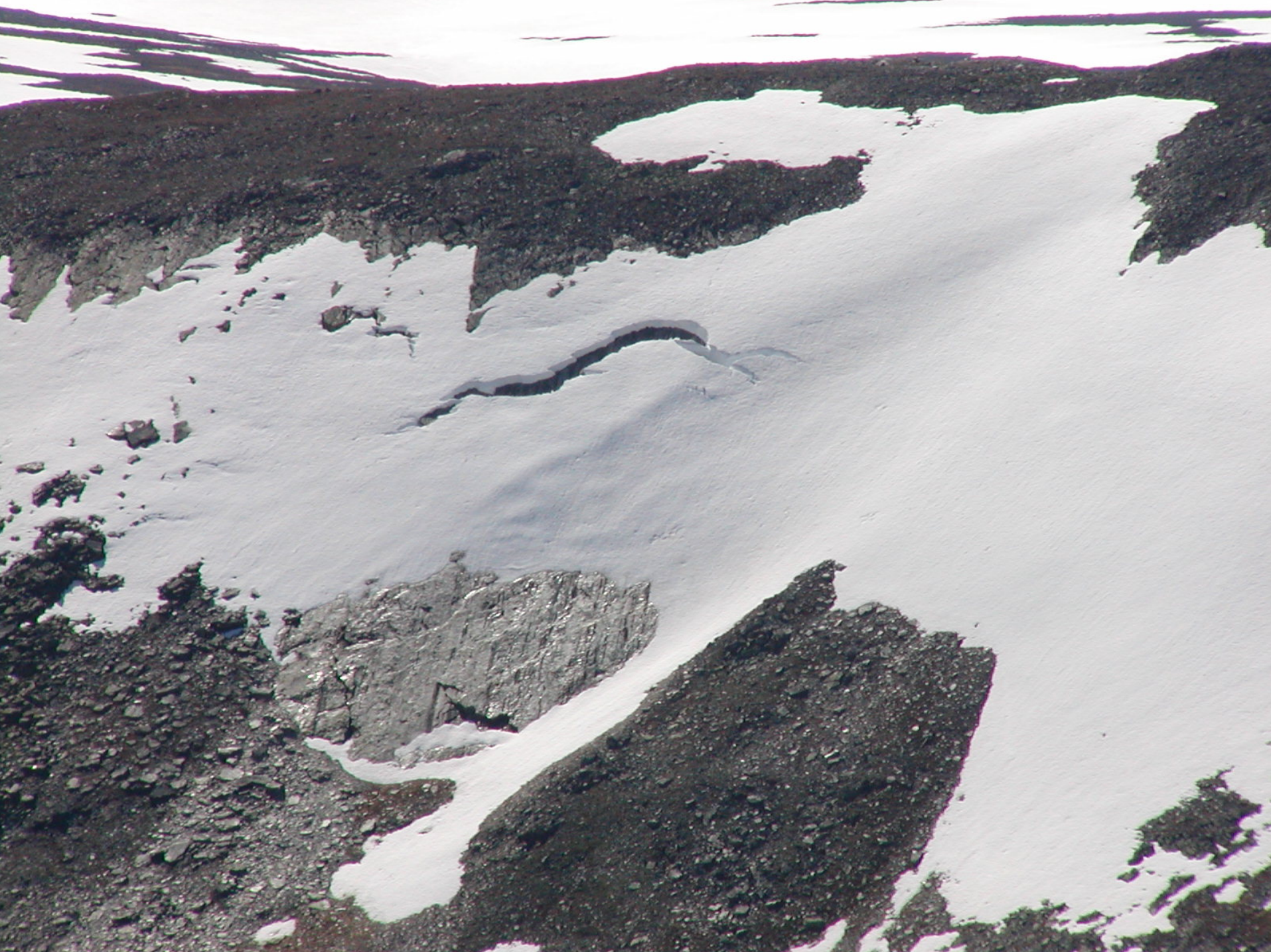

Antropogene causes


Endogene causes


Endogene causes


Exogene causes (climatic)

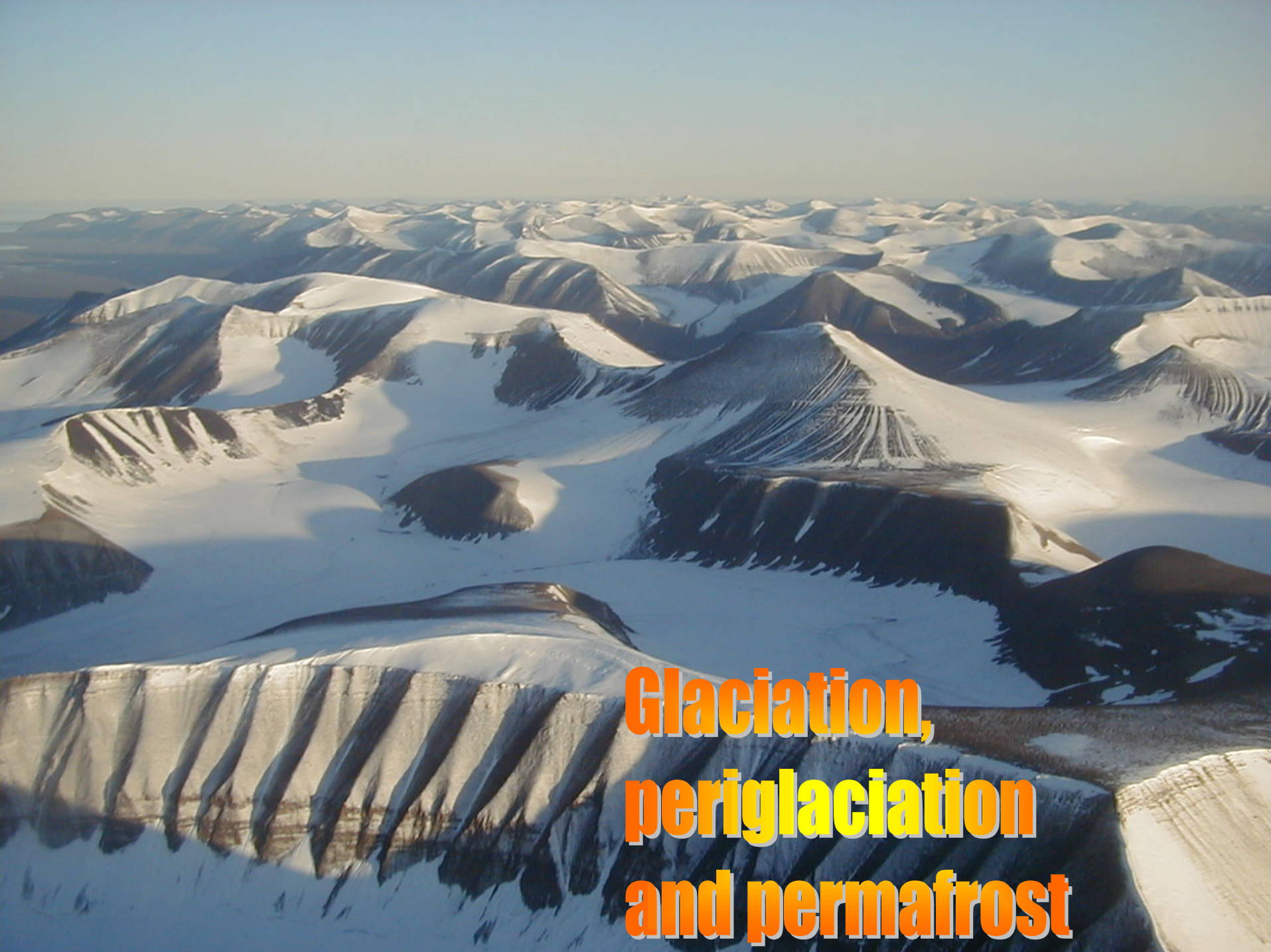

Exogene causes (climatic)

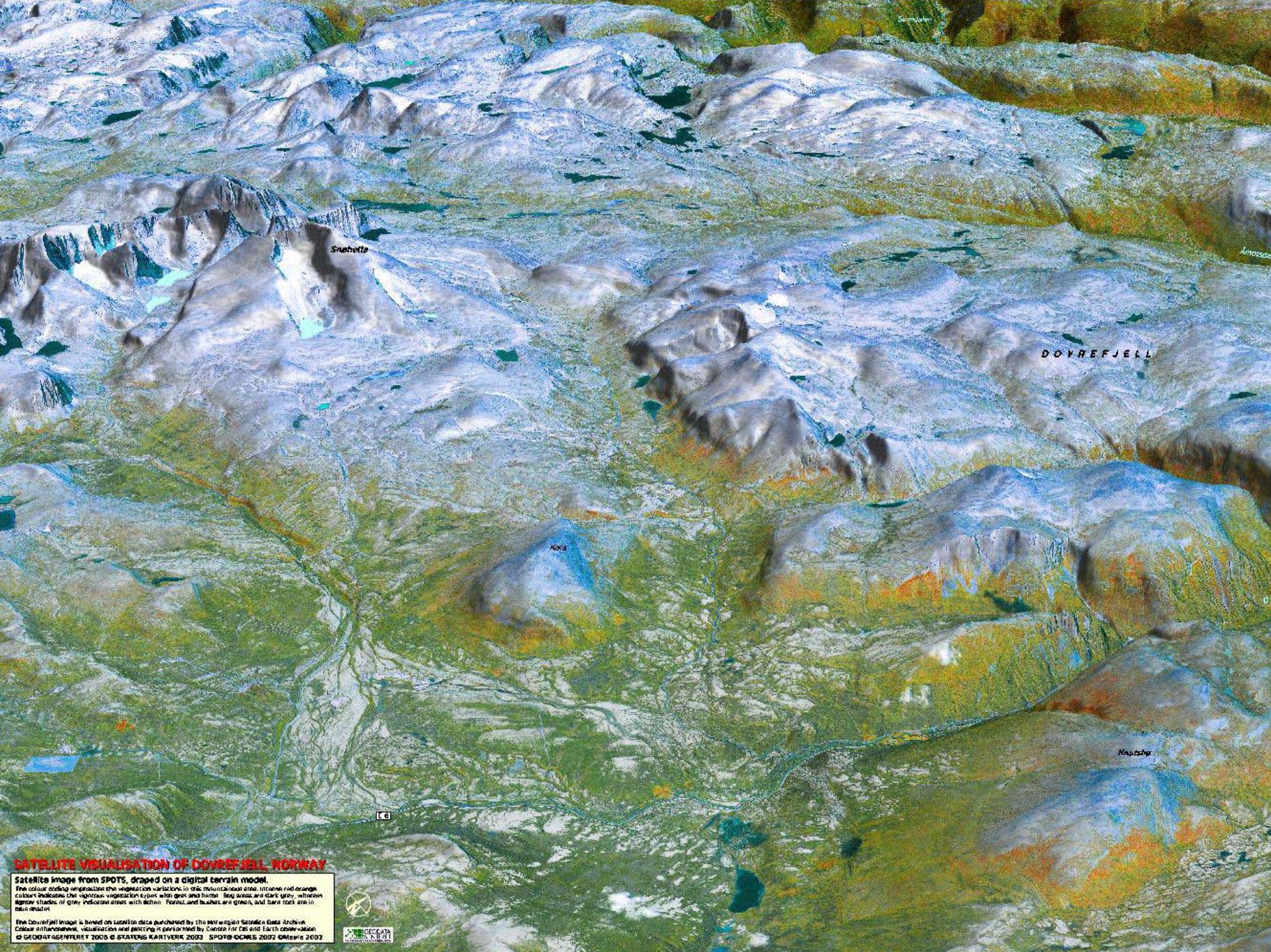



NORGE


Glacial versus periglacial


Trimline


Glaciation,
periglaciation
and permafrost



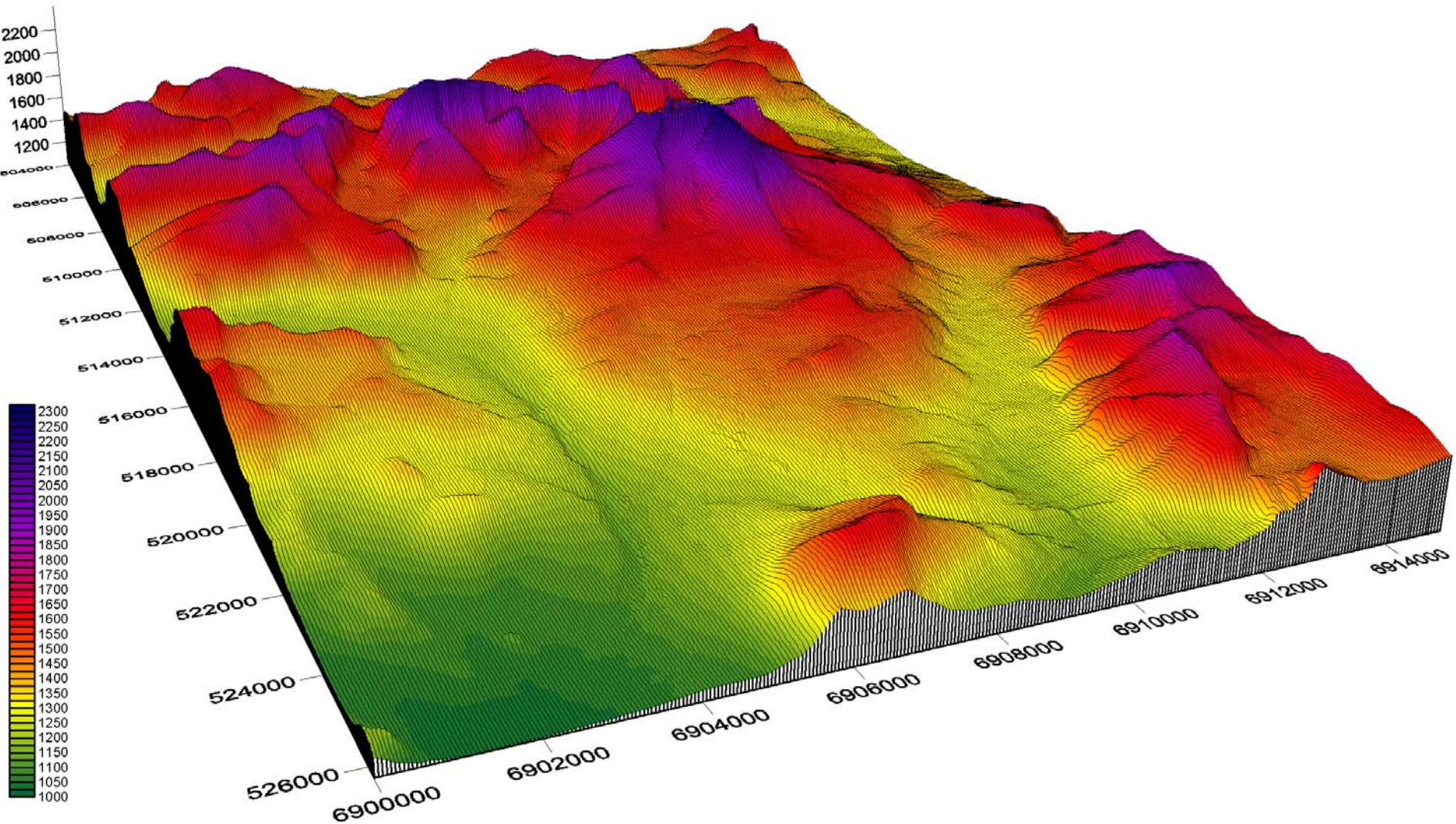
SATELLITE VISUALISATION OF DOVREFJELL, NORWAY

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

The colour coding emphasises the vegetation variations in this mountainous area. Intense red-orange colours indicates the vigorous vegetation types with grass and herbs. Bog areas are dark grey, whereas sparse 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.


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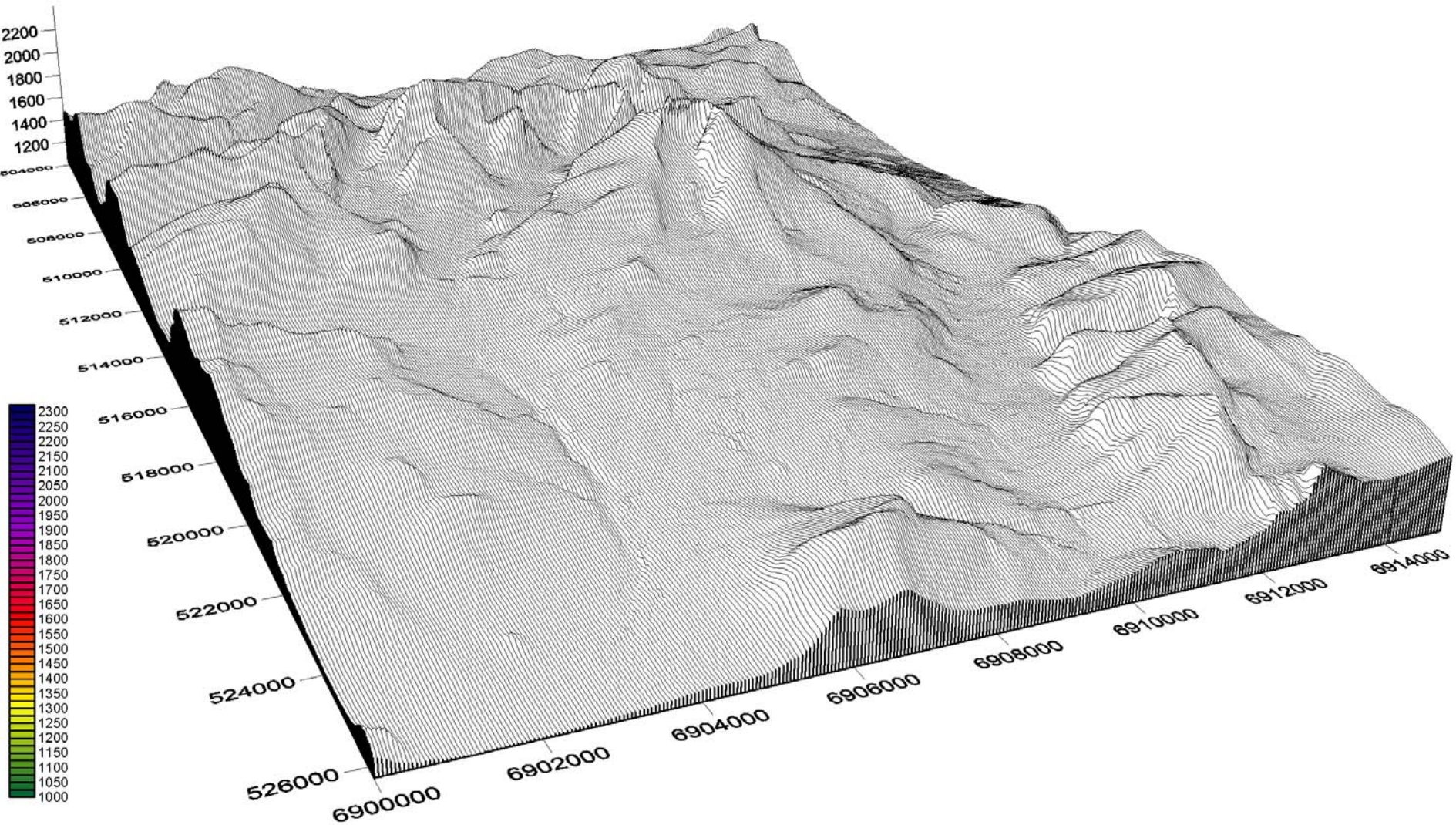
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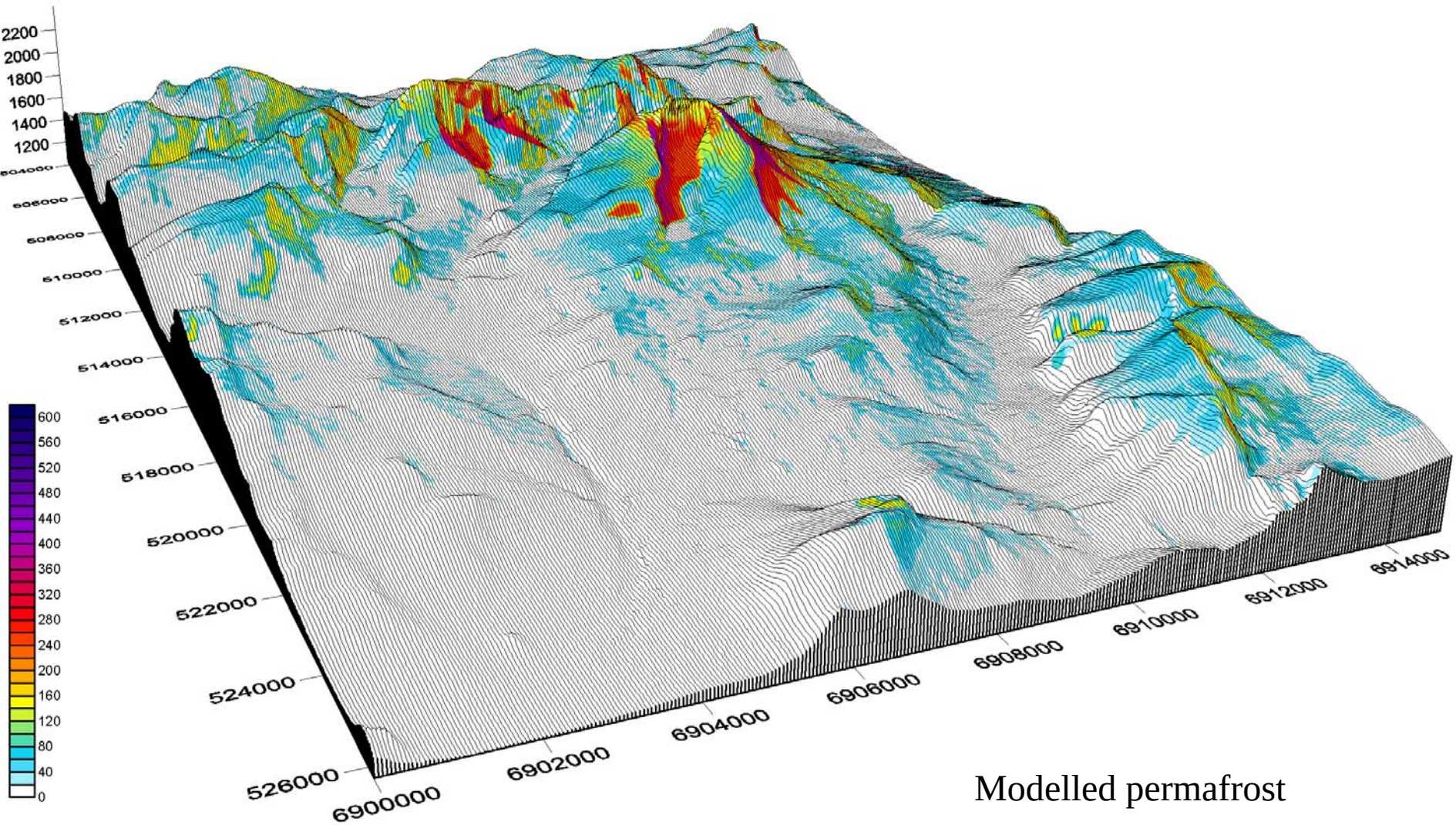


Modelled permafrost

Antatt fjelloverflate
før fjellskredet

Ytre grense
for fjellskred

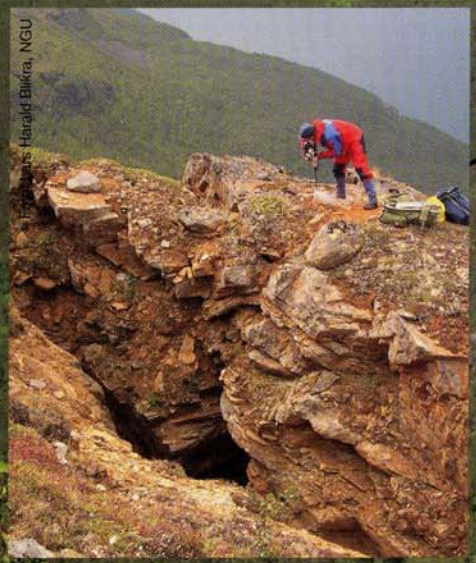
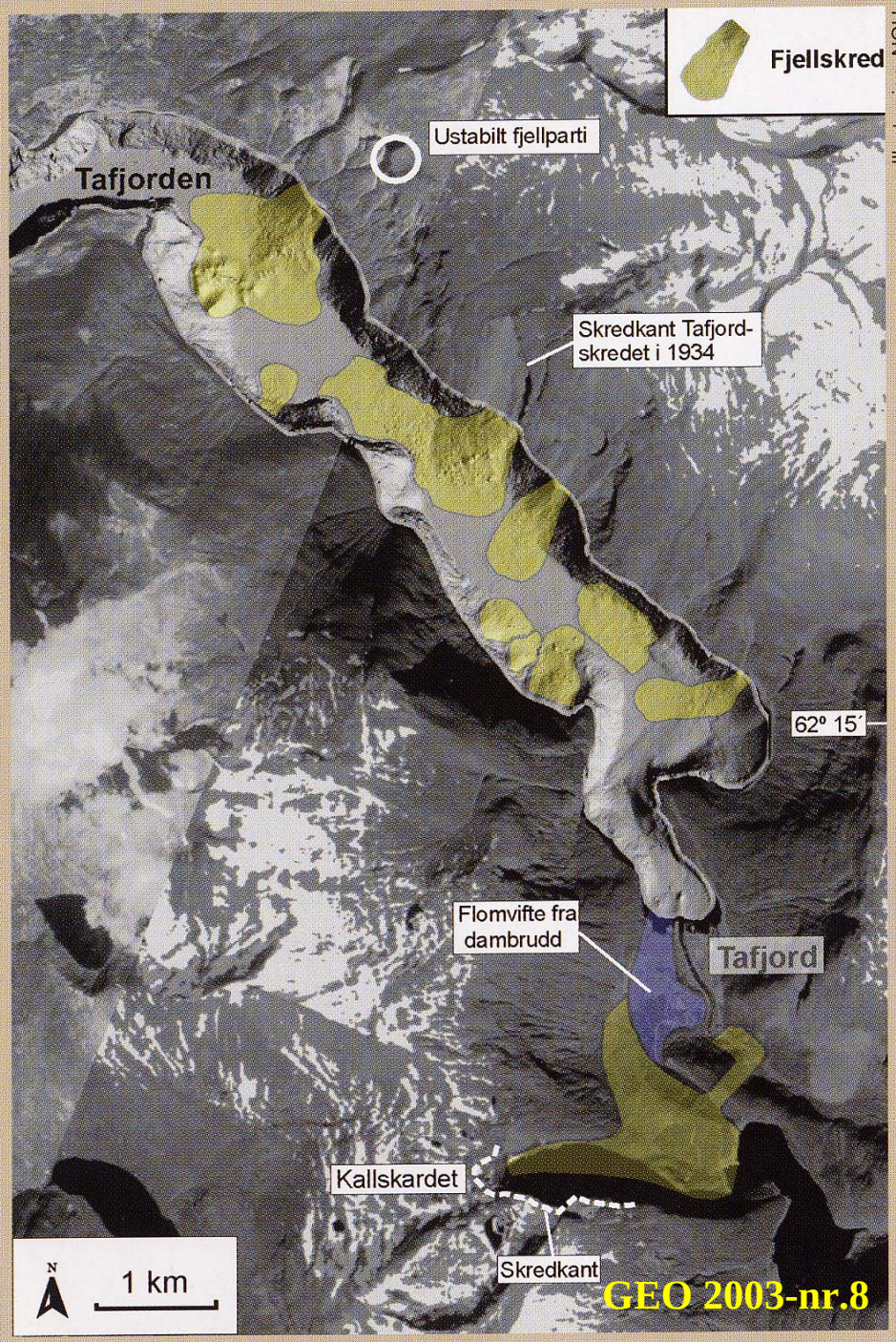


Foto: Lars Harald Blikra, NGU

Overvåking av rasfarlige områder blir mer og mer vanlig. Her setter NGU ut bolter for måling av bevegelsene i fjellet med GPS.



Illustrasjon: NGU

Tafjord i Møre og Romsdal. Satellittfoto viser utglidningene i de bratte fjellsidene, og det detaljerte batymetriske kartet viser at det ligger mange store fjellskred på fjordbunnen.

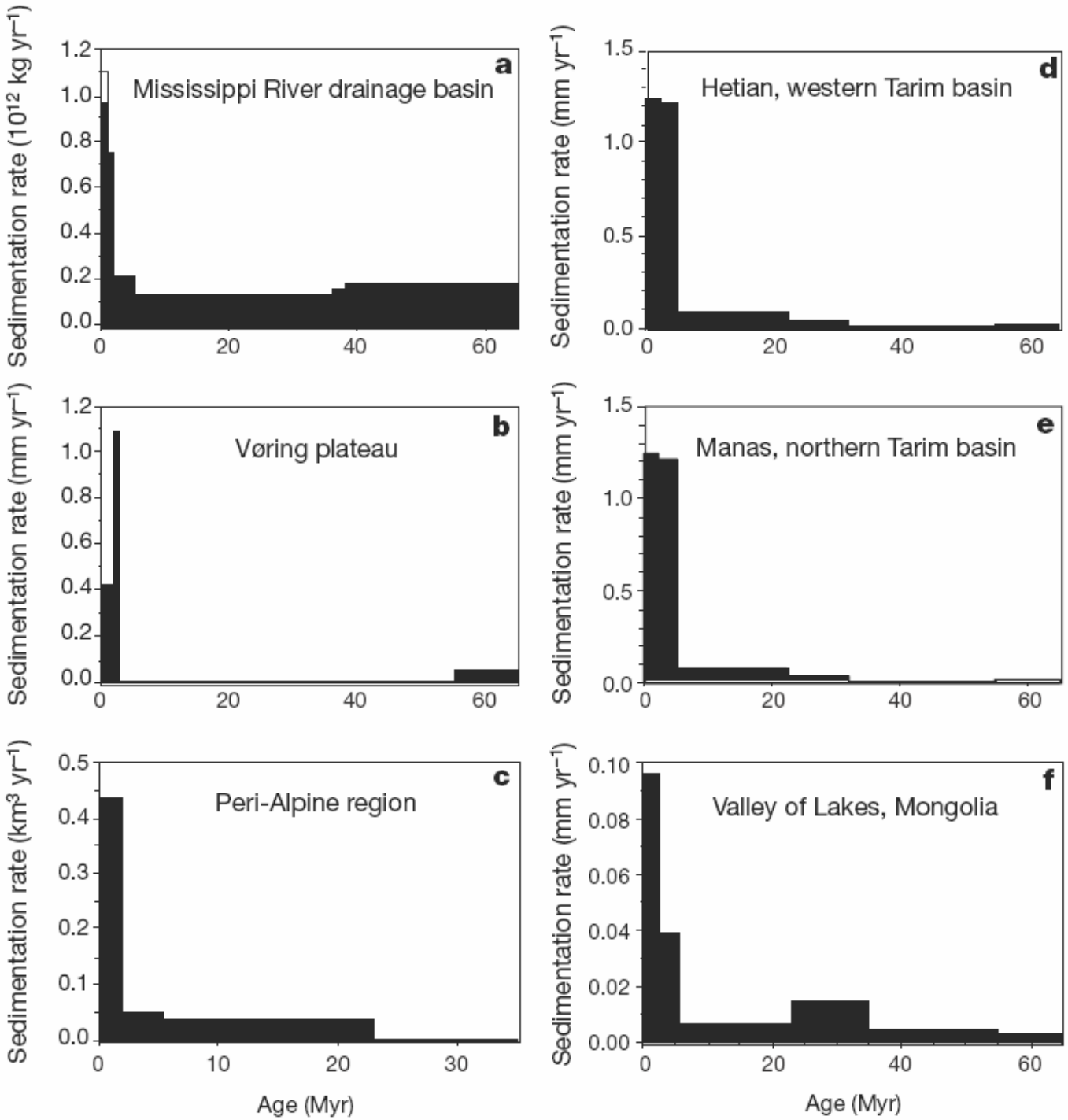

+10°


OLYMPUS

Knowledge on geomorphic processes:

1: Background for interpreting landforms

2: Background for interpreting climate


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)

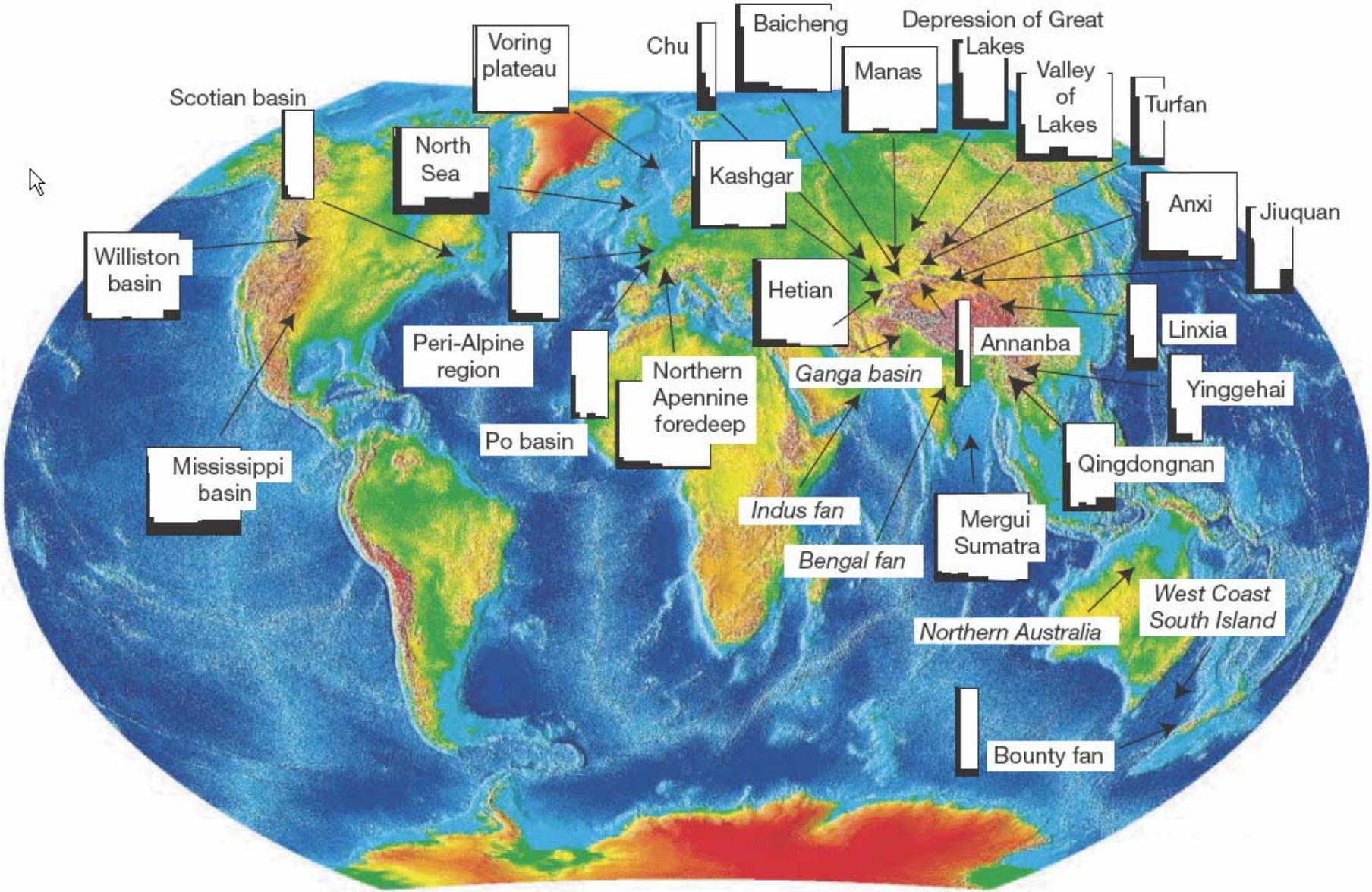
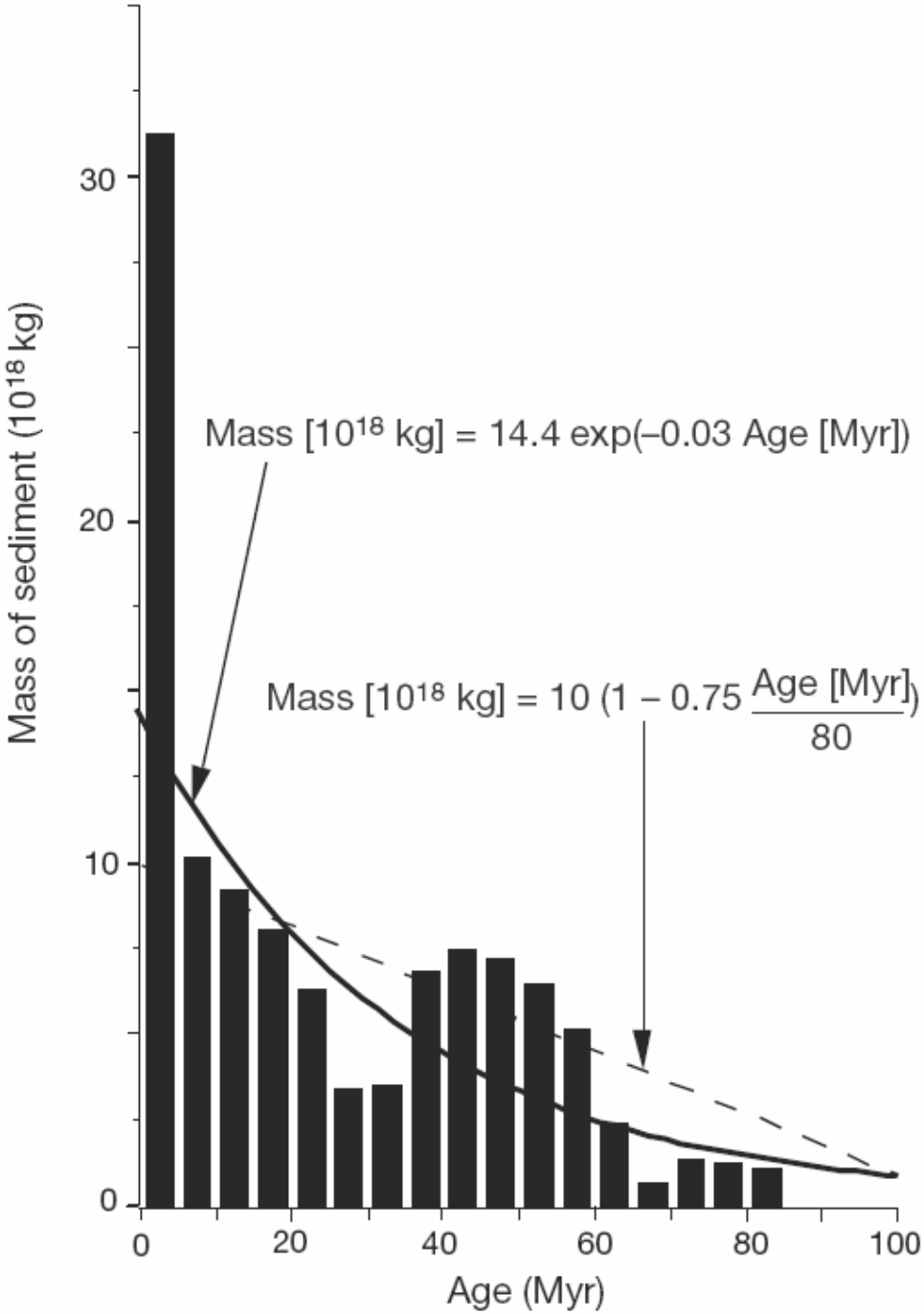


Figure 2 Map of the Earth showing selected areas where sedimentation rates have increased substantially since 2–4 Myr ago. (Details are given in Fig. 4 and Supplementary Information.) For each area, a small histogram is shown. The vertical scale is normalized to the maximum sedimentation rate in that 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.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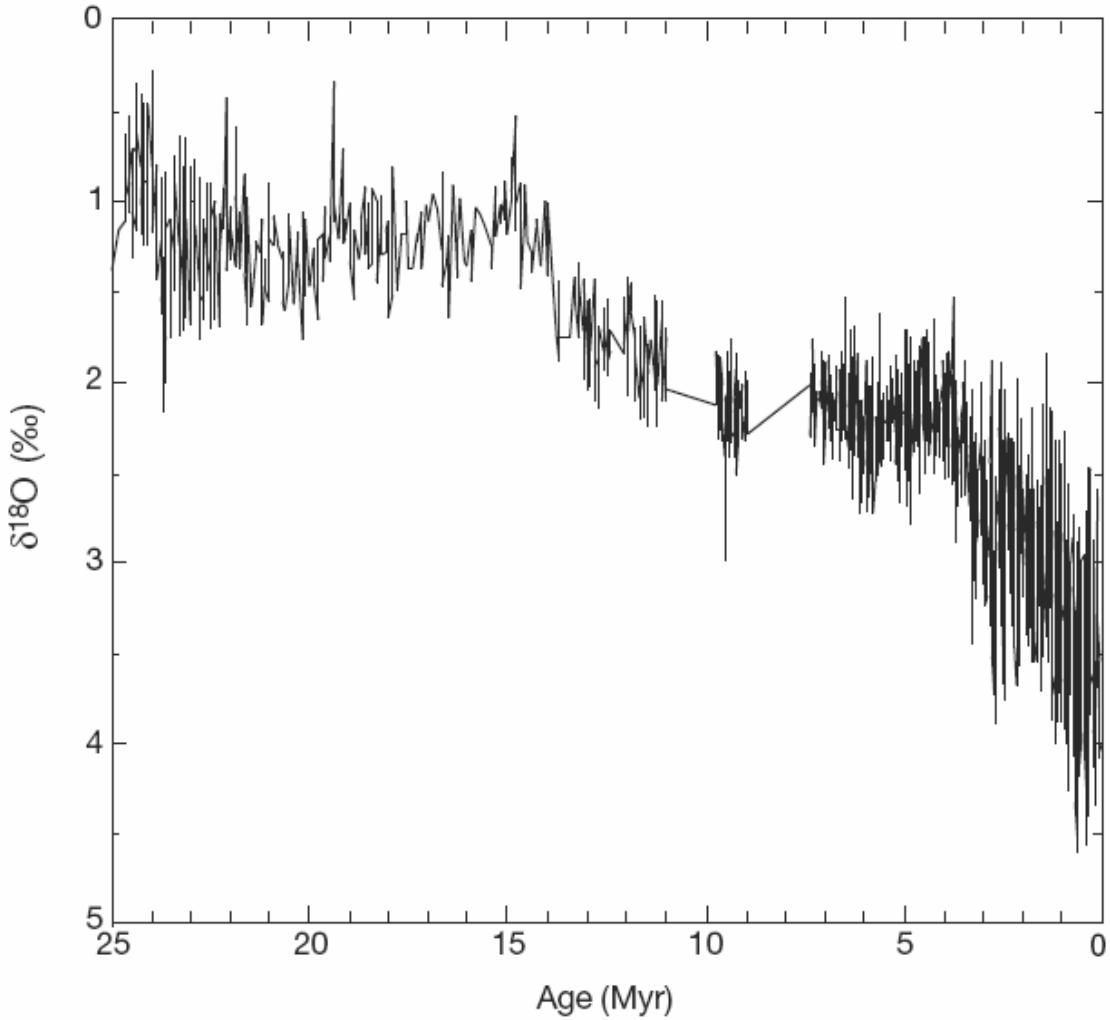

Figure 1 Plot of $\delta^{18}O$ from benthic foraminifers since 25 Myr ago, showing increases in mean values and in variability since ~4 Myr ago. The former increases imply cooling, and the latter increases imply an increasingly variable climate. Values (in ‰) have been measured largely (~95%) from fossil 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.

Periglacial and glacial

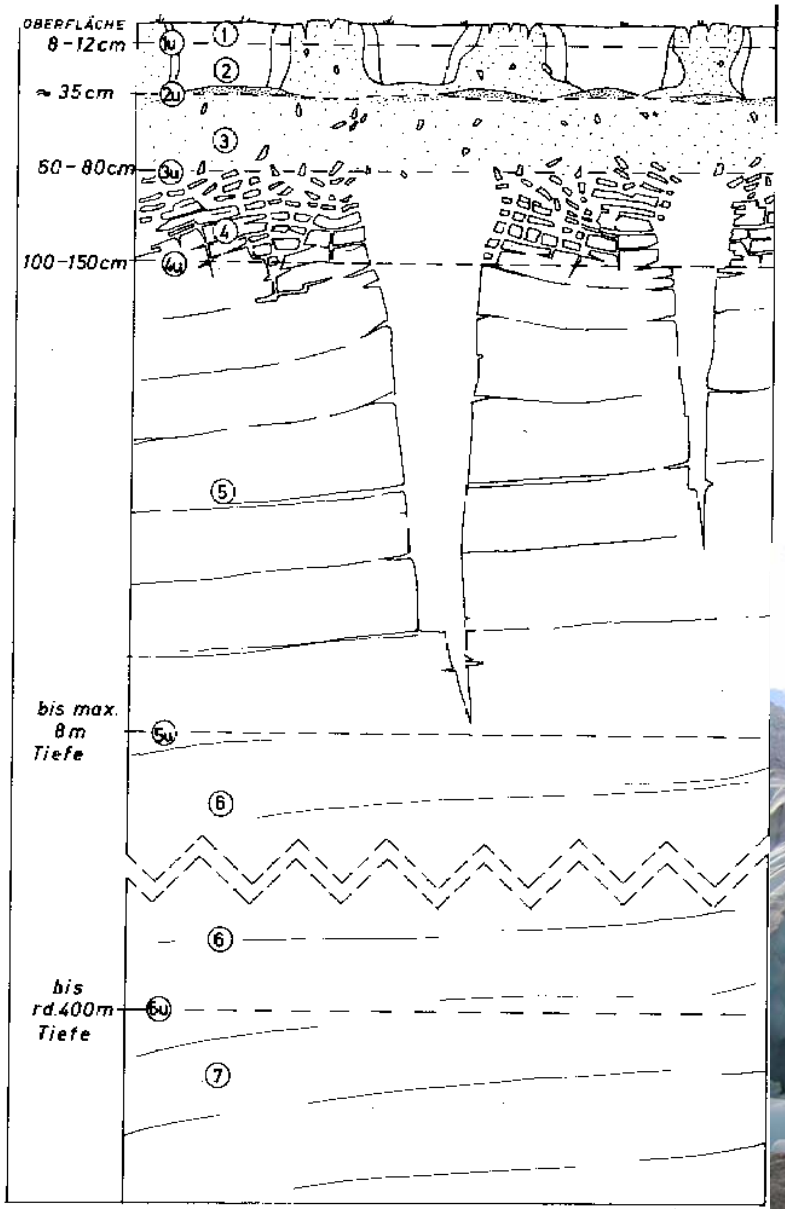

Fig. 19. Profil des Dauerfrostbereichs in Südost-Spitzbergen.

1 = Bereich hochsommerlicher Bodenaustrocknung, 1 u = dessen Untergrenze. 2 = Sommerlicher Auftauboden mit Froststrukturen, 2 u = dessen Unter-

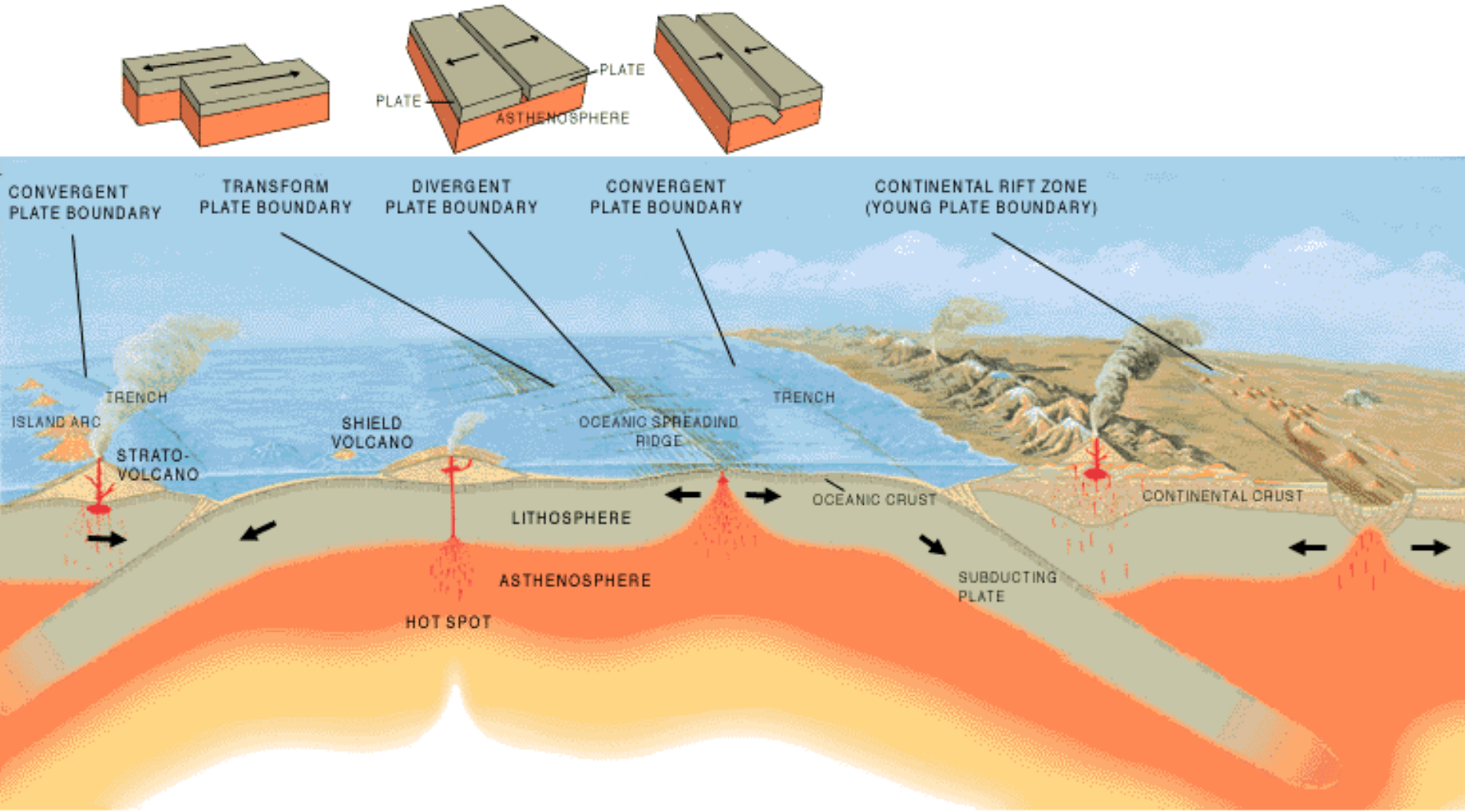
PLATE
PLATE
ASTHENOSPHERE
CONVERGENT PLATE BOUNDARY
TRANSFORM PLATE BOUNDARY
DIVERGENT PLATE BOUNDARY
CONVERGENT PLATE BOUNDARY
CONTINENTAL RIFT ZONE (YOUNG PLATE BOUNDARY)
TRENCH
ISLAND ARC
STRATO-VOLCANO
SHIELD VOLCANO
OCEANIC SPREADING RIDGE
TRENCH
OCEANIC CRUST
CONTINENTAL CRUST
LITHOSPHERE
ASTHENOSPHERE
HOT SPOT
SUBDUCTING PLATE


Uplift


Climate ?