Permafrost landforms 1

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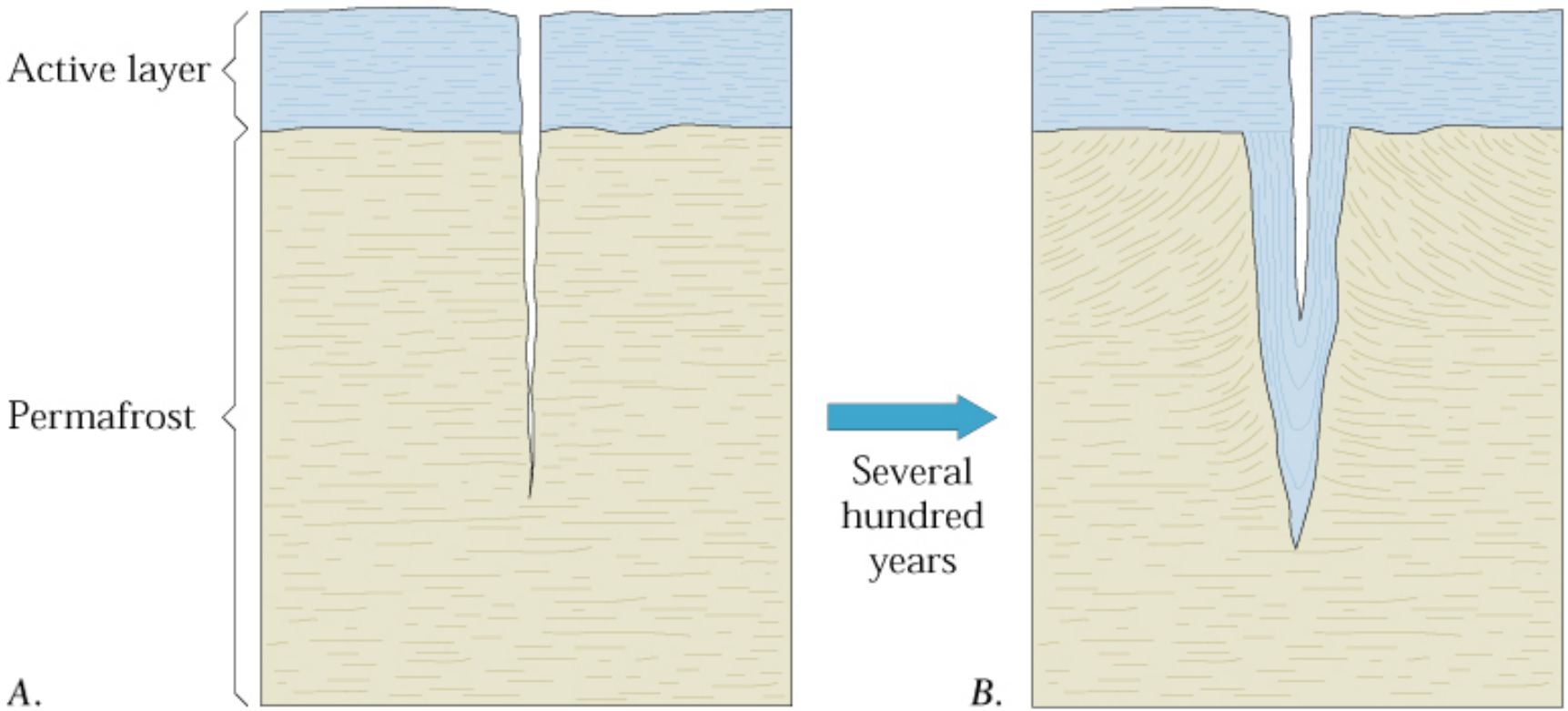
1: Ice wedges

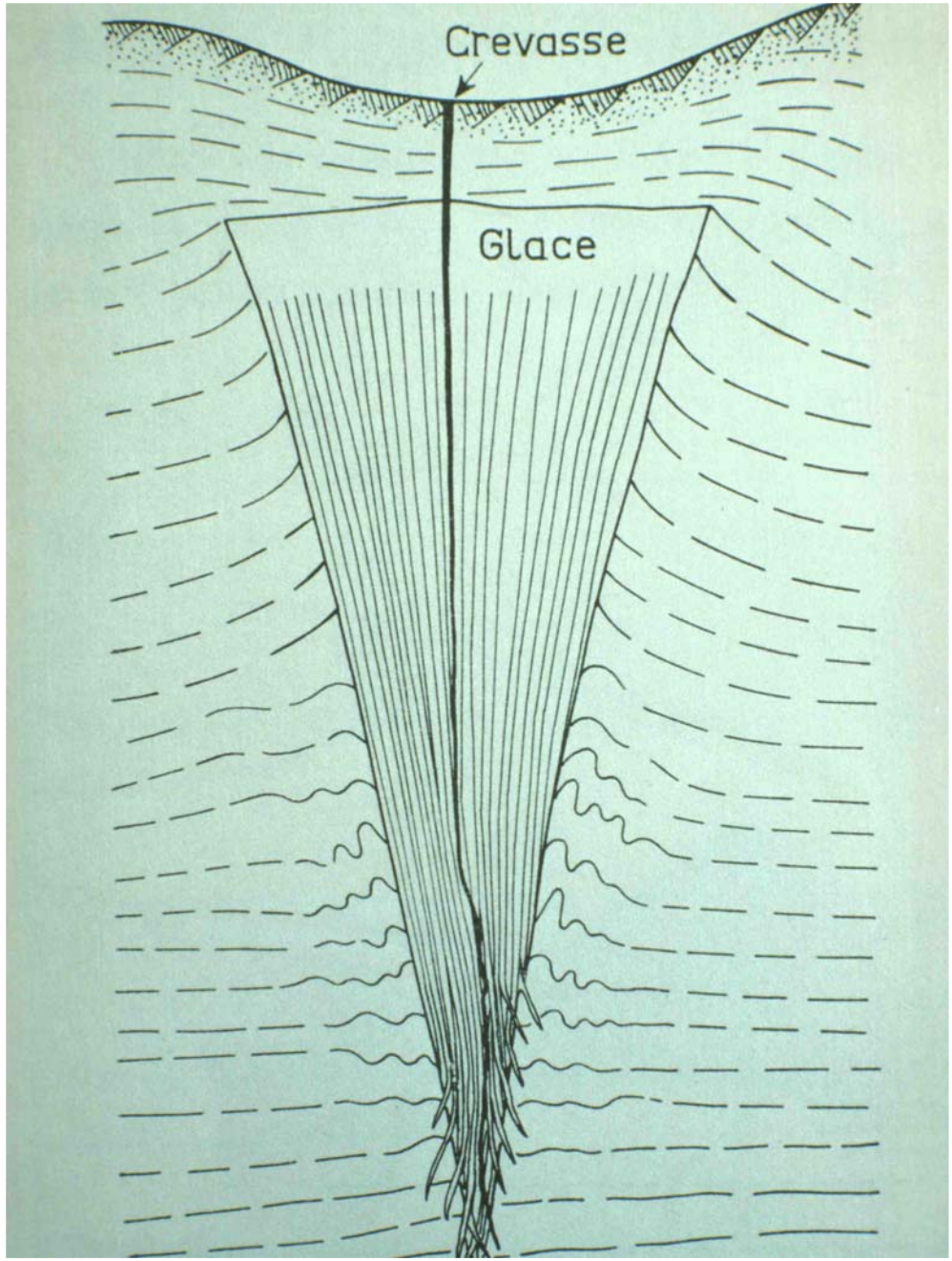
2: Pingos

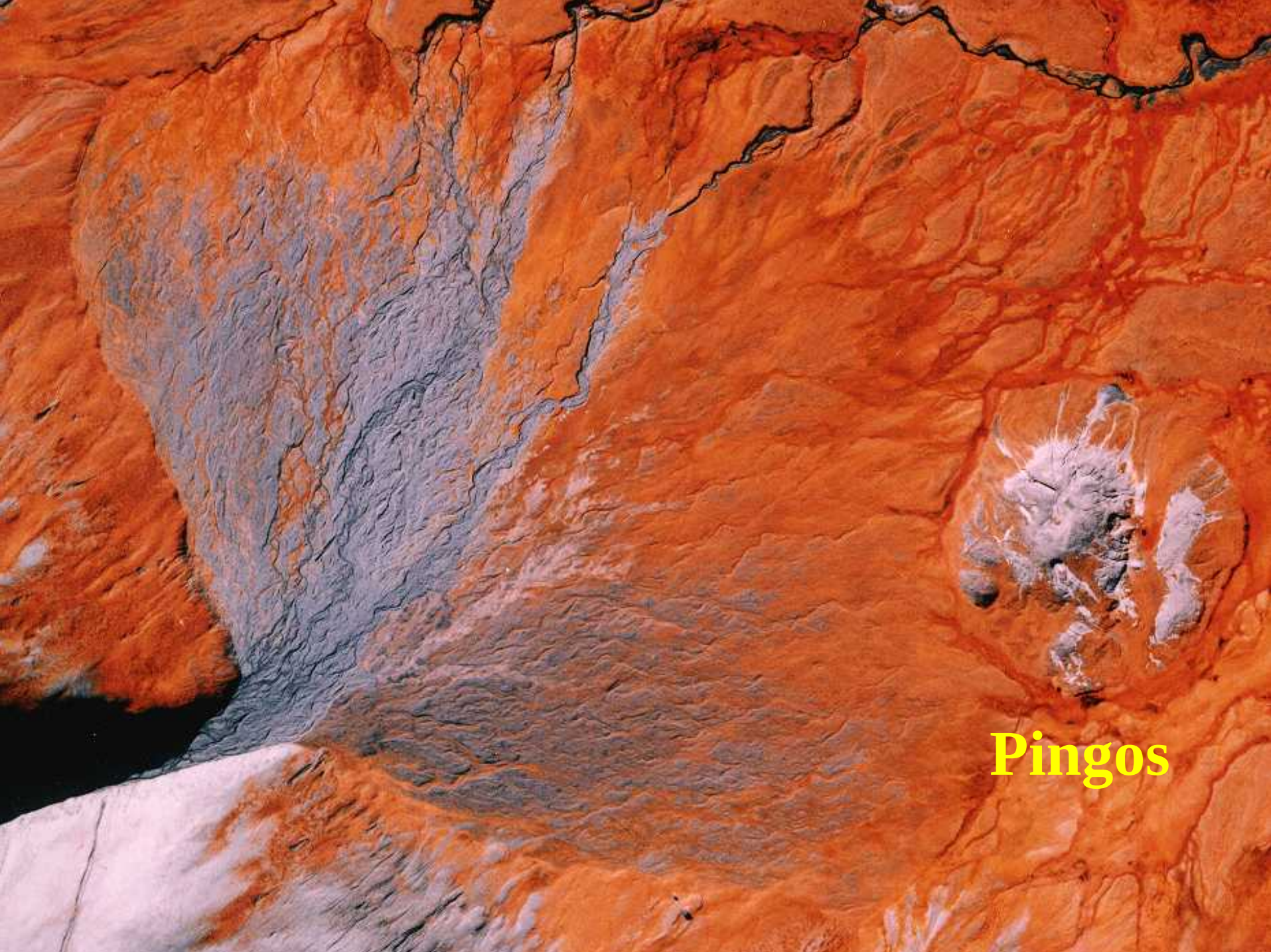
3: Palsas

3: Large sorted phenomena


Ice wedges

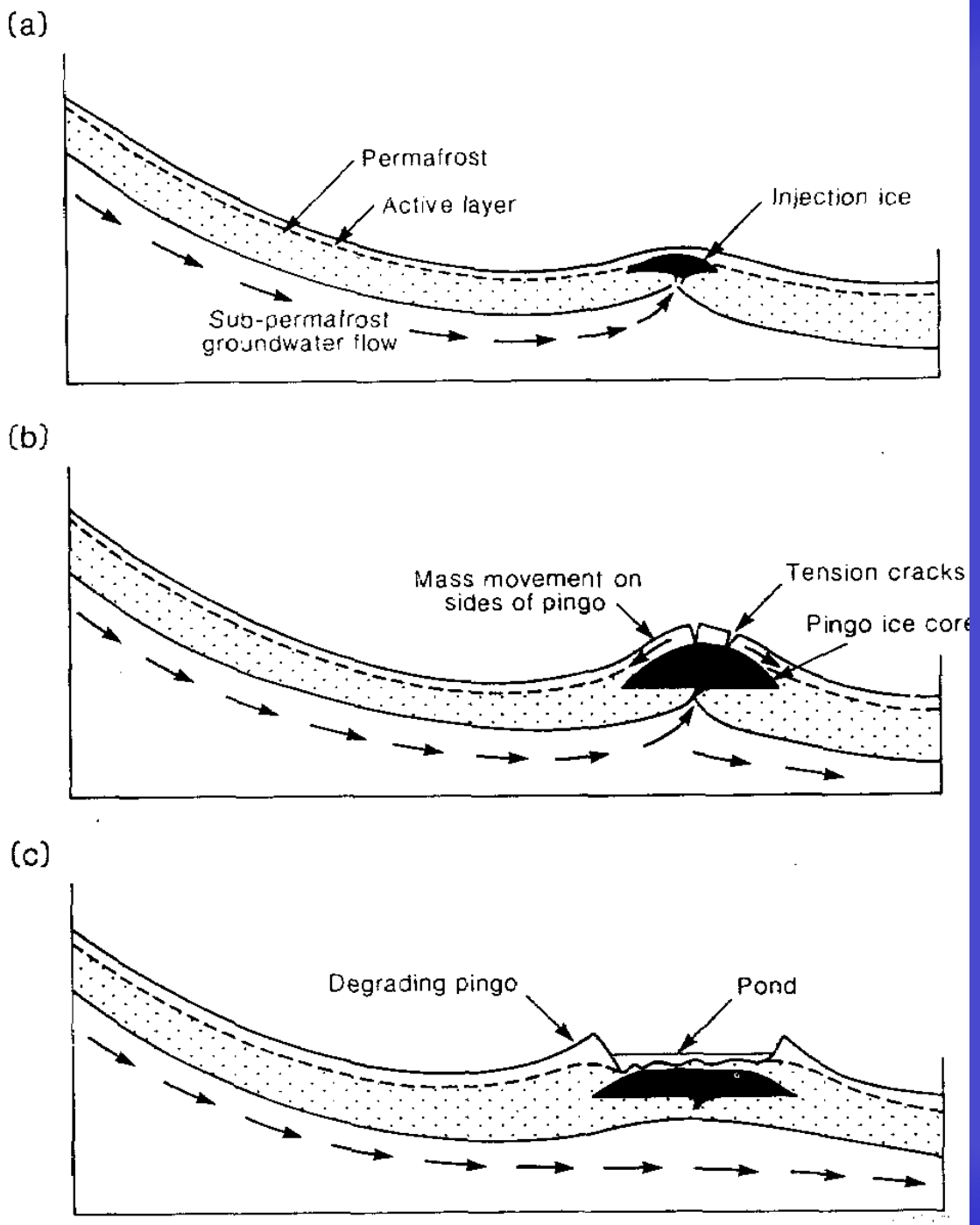



Crevasse
Glace


Pingos

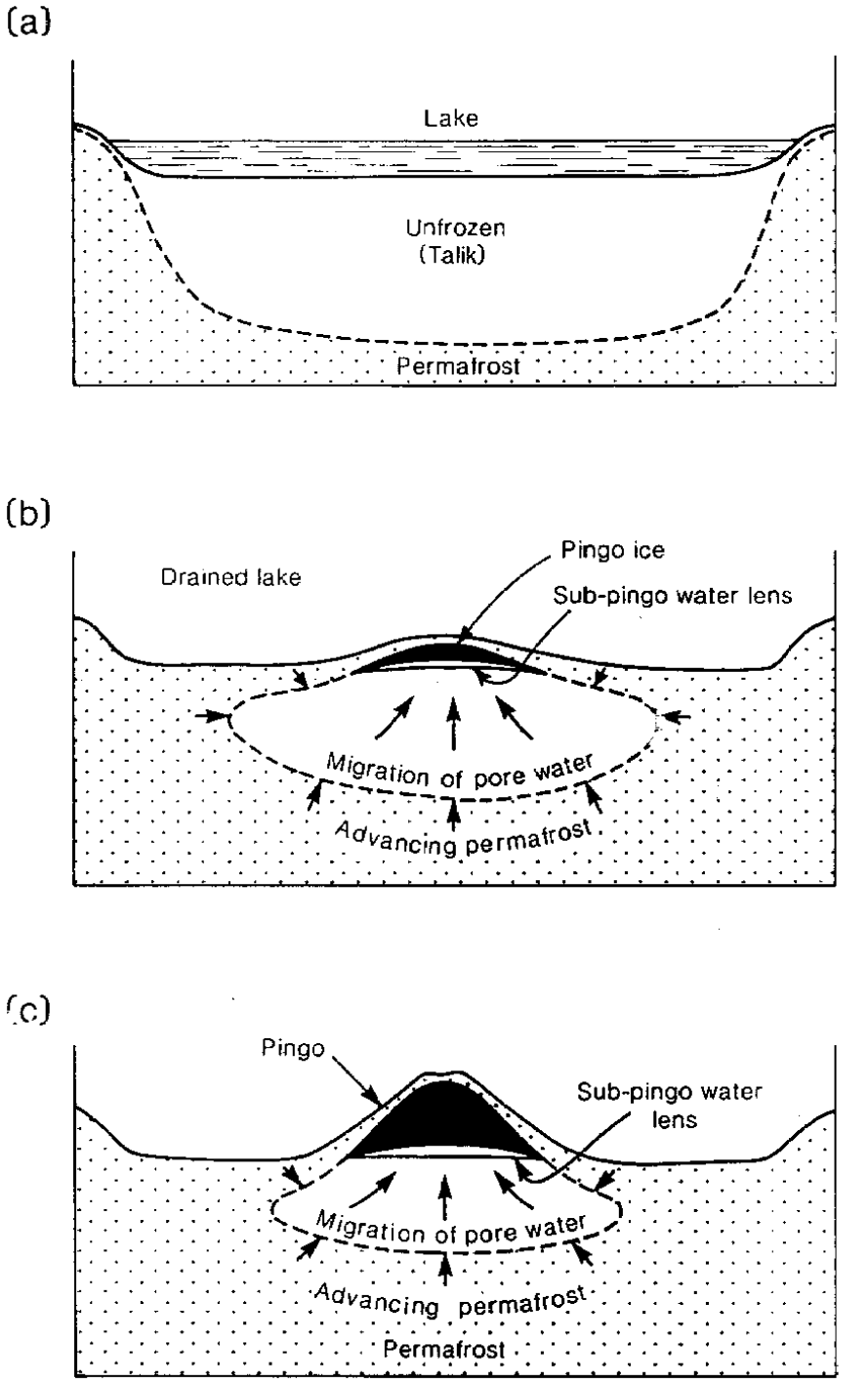
Open system pingos

This pingo type is usually found in high relief permafrost areas

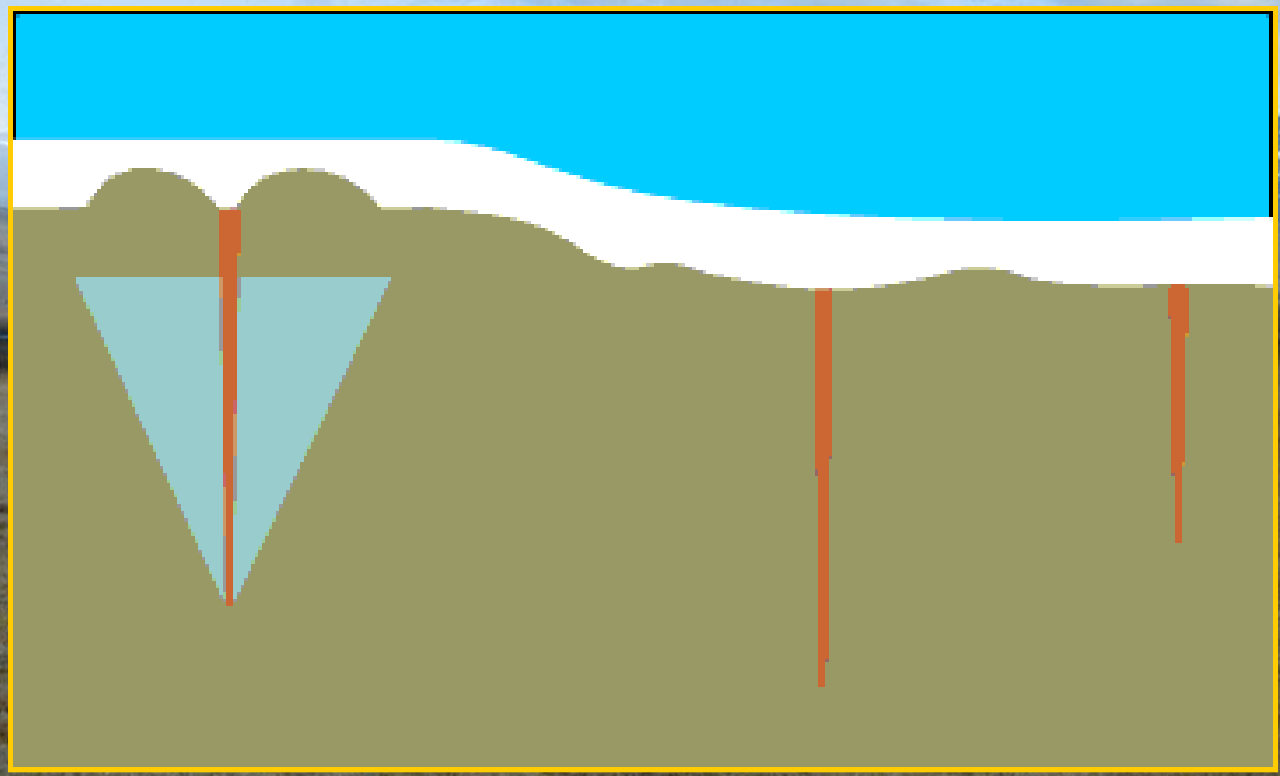


Closed system pingos

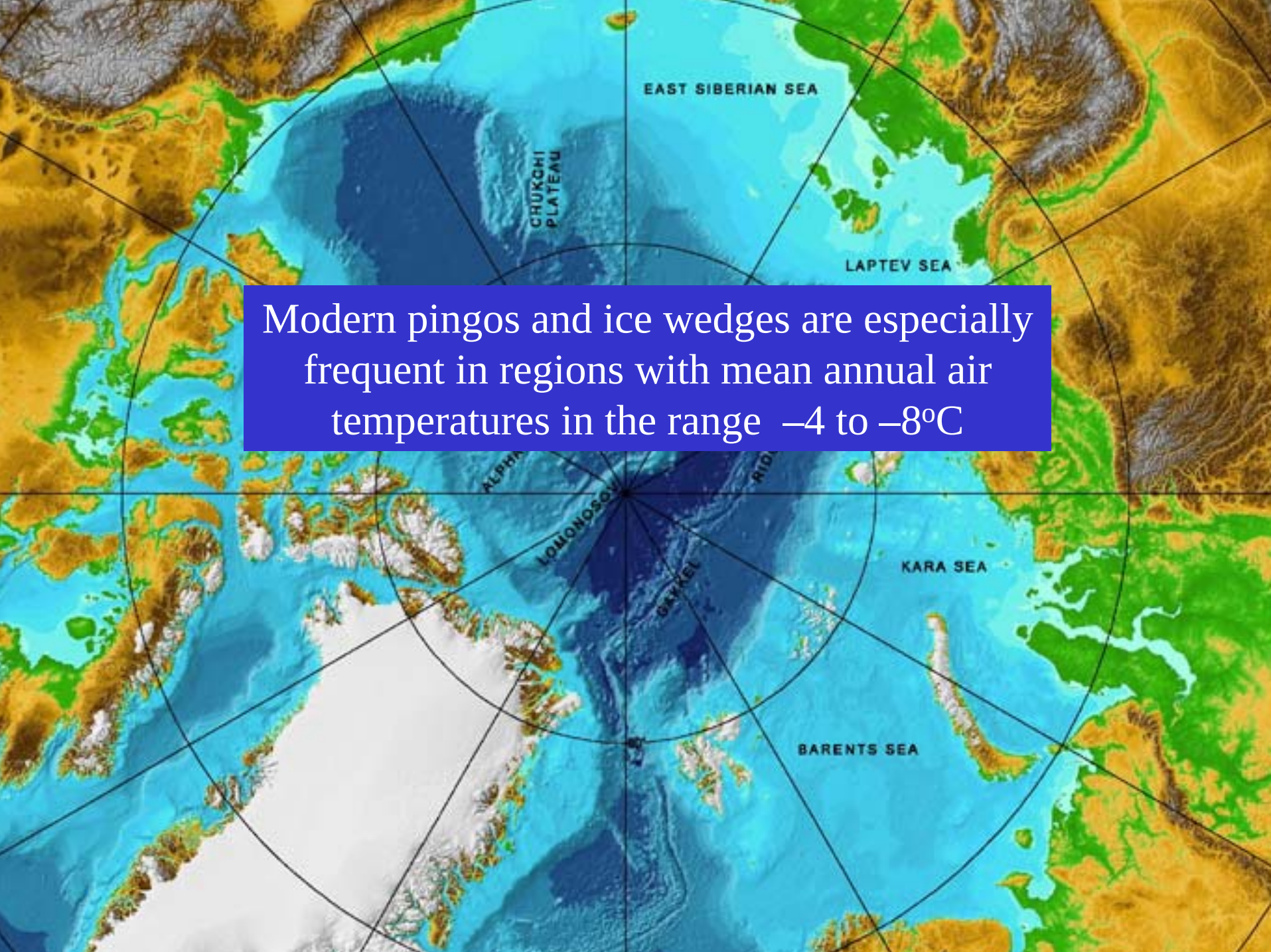
This pingo type is usually found in low relief permafrost areas



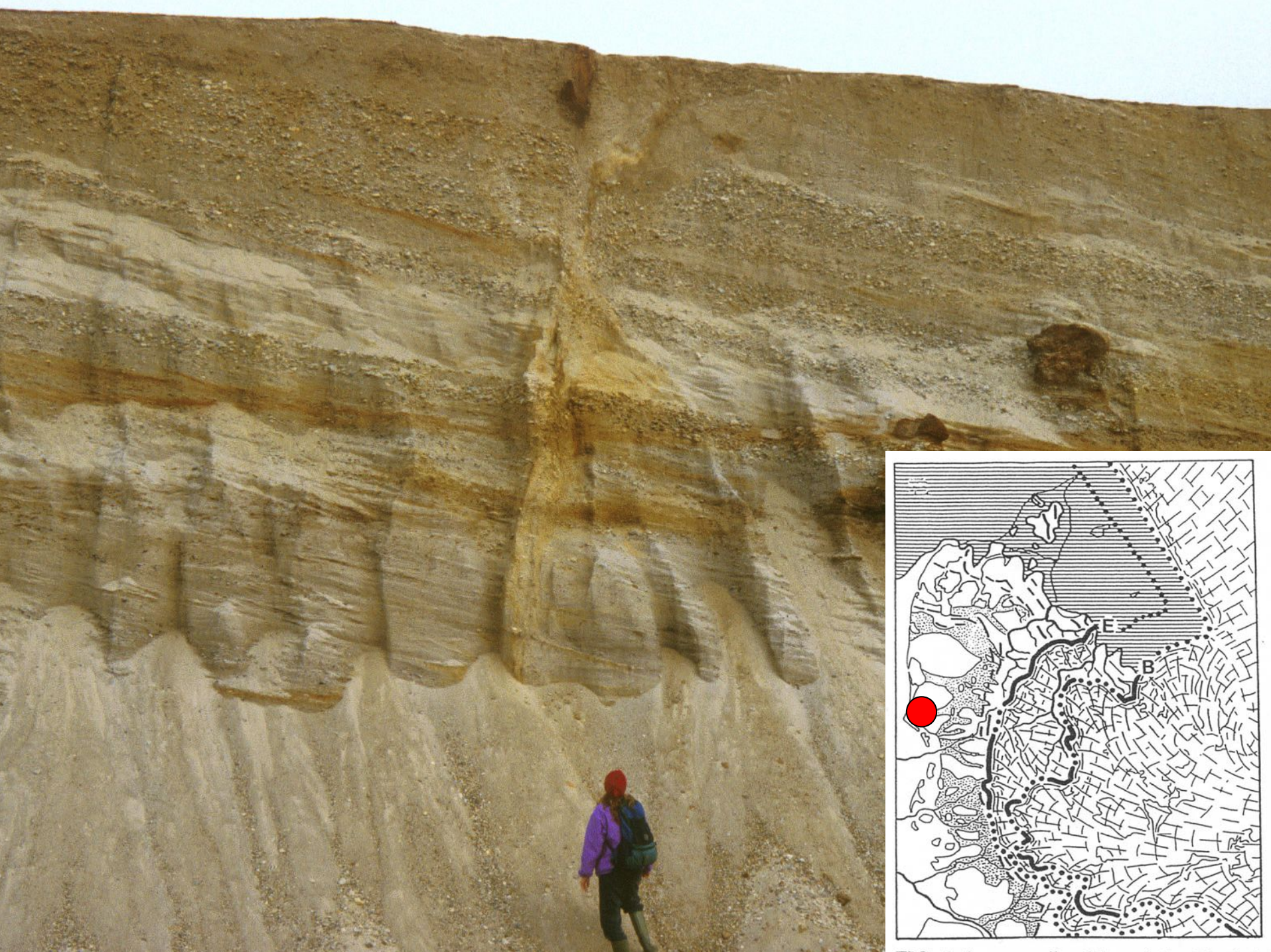

Frost blisters



Origin of ice wedges and pingos (and lakes)



Modern pingos and ice wedges are especially frequent in regions with mean annual air temperatures in the range –4 to –8°C


E
B

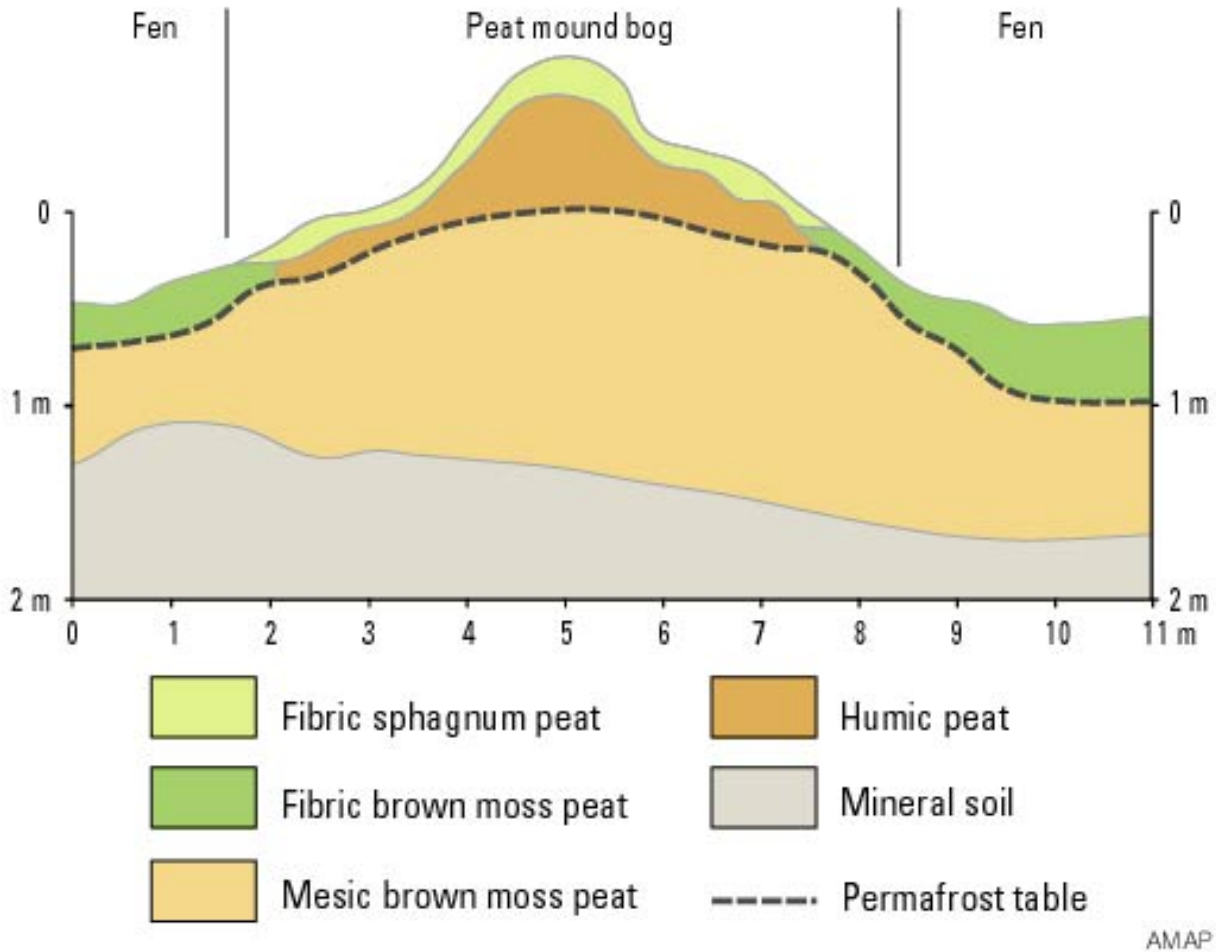

Arctic circle
FINLAND
CCCP
NORWAY
Salpausselkä
Ra
SWEDEN
DENMARK
Weichsel
0
500
1000 km

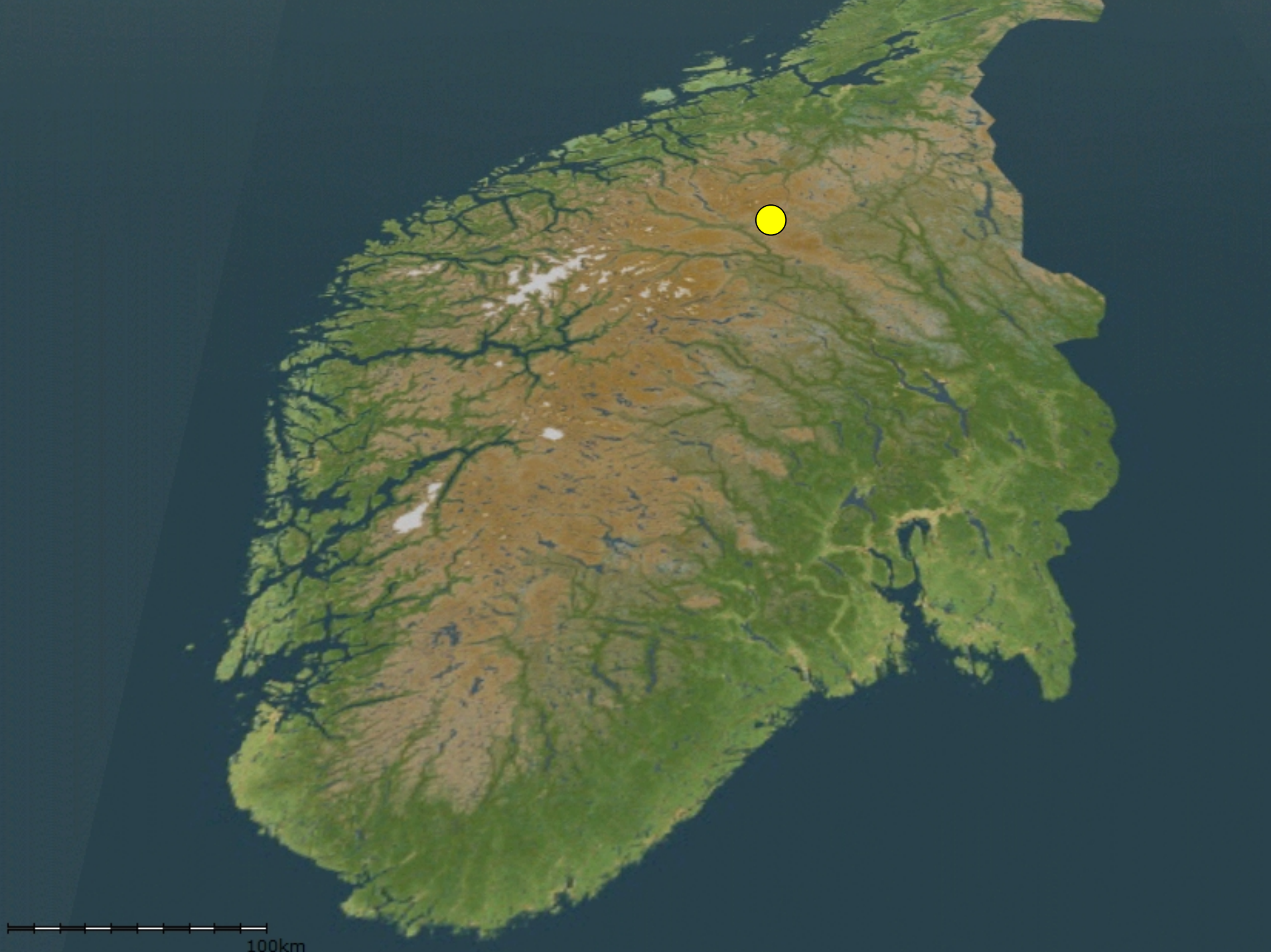

400 m
437 yards
Ice wedge polygons on Mars ?

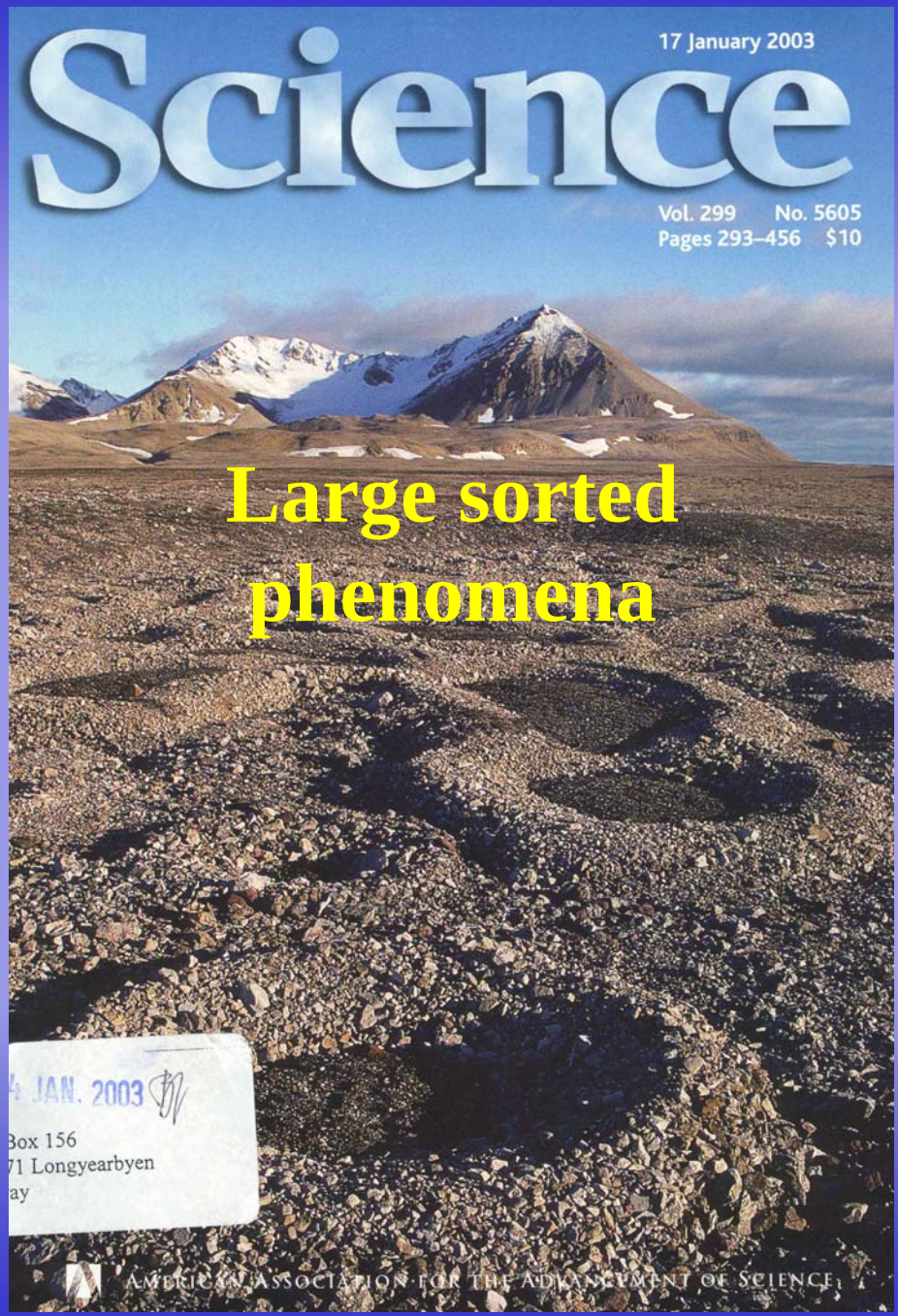

Palsas

Arctic Monitoring and Assessment Programme

AMAP Assessment Report: Arctic Pollution Issues, Figure 2-14




100km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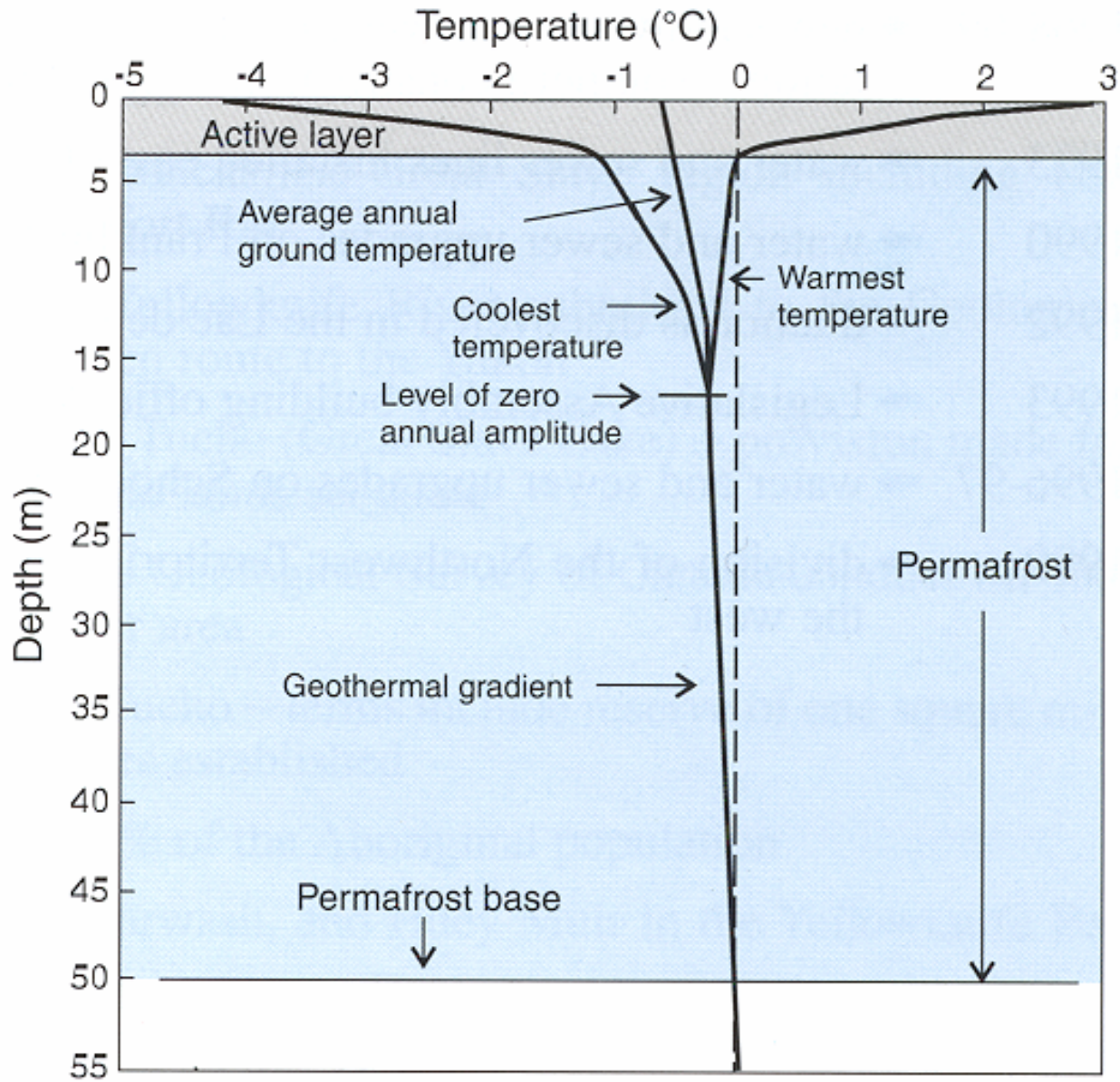

Temperature (°C)
-5
-4
-3
-2
-1
0
1
2
3
Depth (m)
0
5
10
15
20
25
30
35
40
45
50
55
Active layer
Average annual ground temperature
Coolest temperature
Warmest temperature
Level of zero annual amplitude
Permafrost
Geothermal gradient
Permafrost base

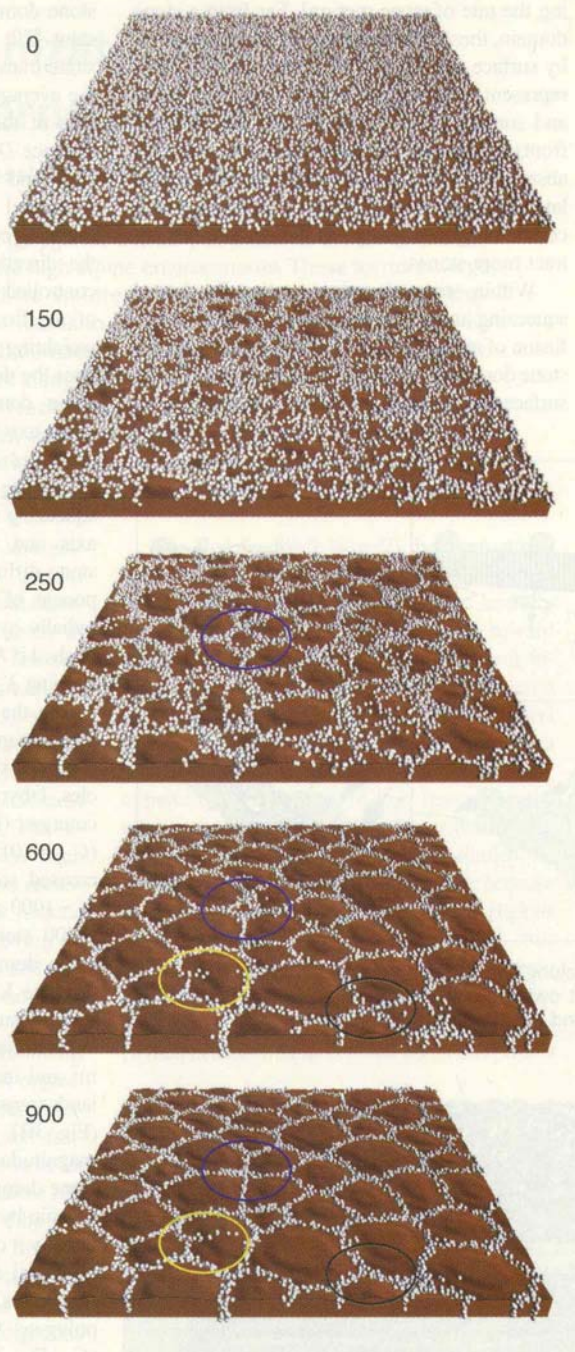
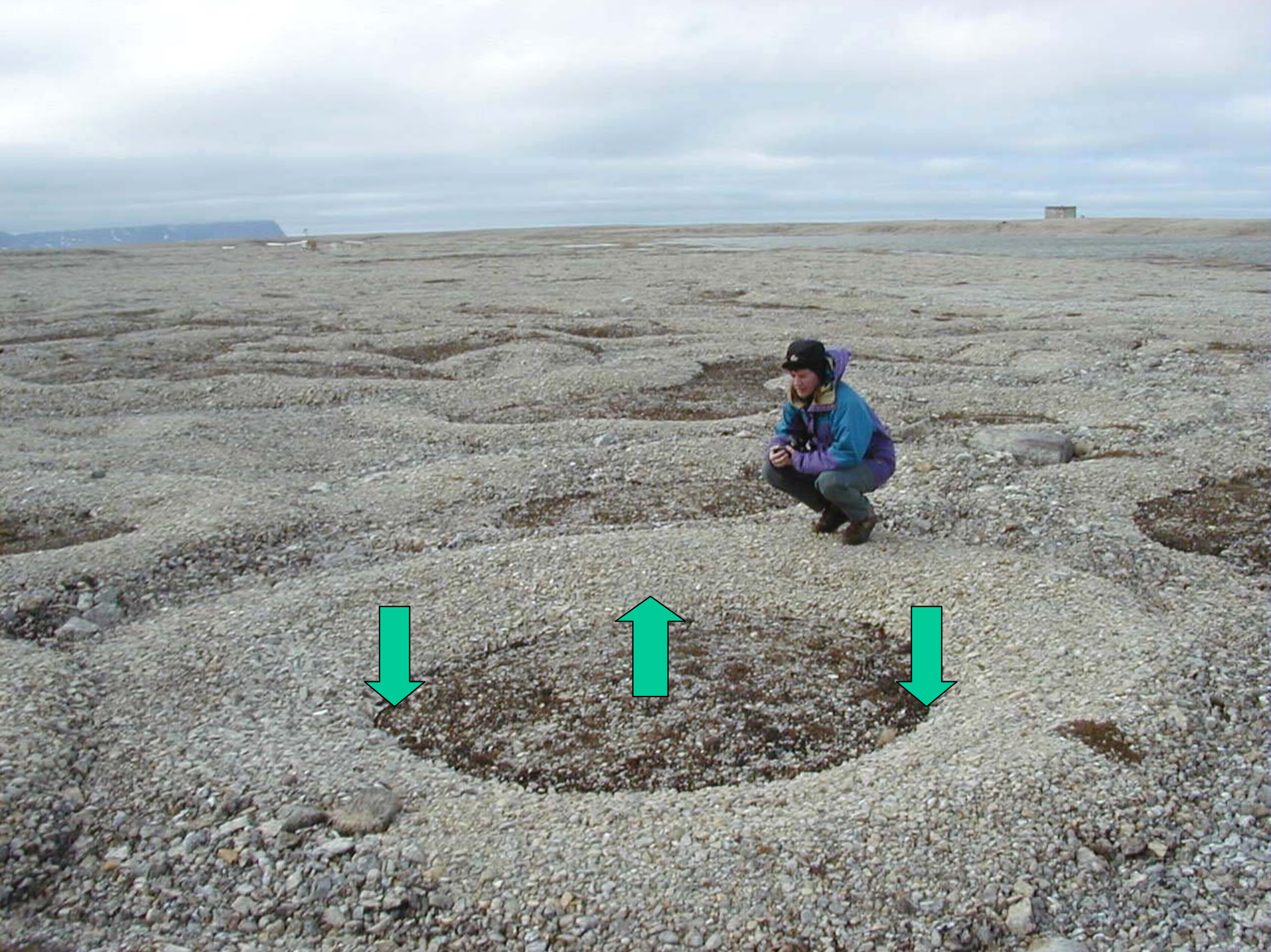
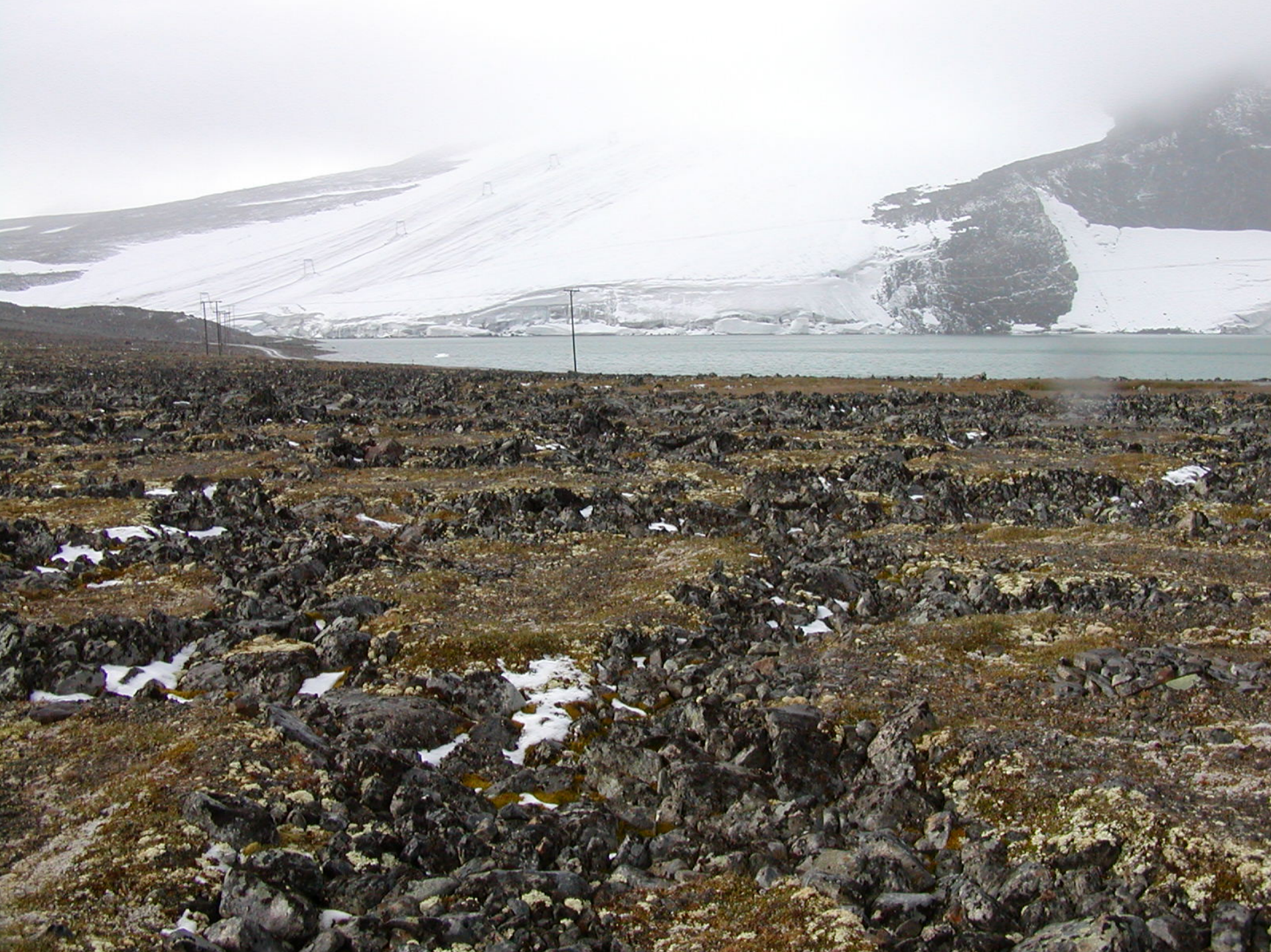


Fig. 4. Development of sorted polygons from a random initial configuration. Blue ovals indicate a small polygon evolving to an intersection. Black ovals indicate a transition from a four-way to a three-way intersection through the shrinking of a neighboring soil domain. Yellow ovals indicate an unstable perturbation on a stone domain extending across a soil domain. Numbers indicate the iteration pictured. Simulation size = 10 × 10 m, 10,000 stones, cell width = 0.1 m, D_{ls} = 0.5 m, K_{ls} = 0.005 m^2/cycle, D_{sq} = 0.2 m, $K_{sq}dw$ = 0.002 m^3/cycle, C_{sq} = 1.0, H_{max} = 10 stones.





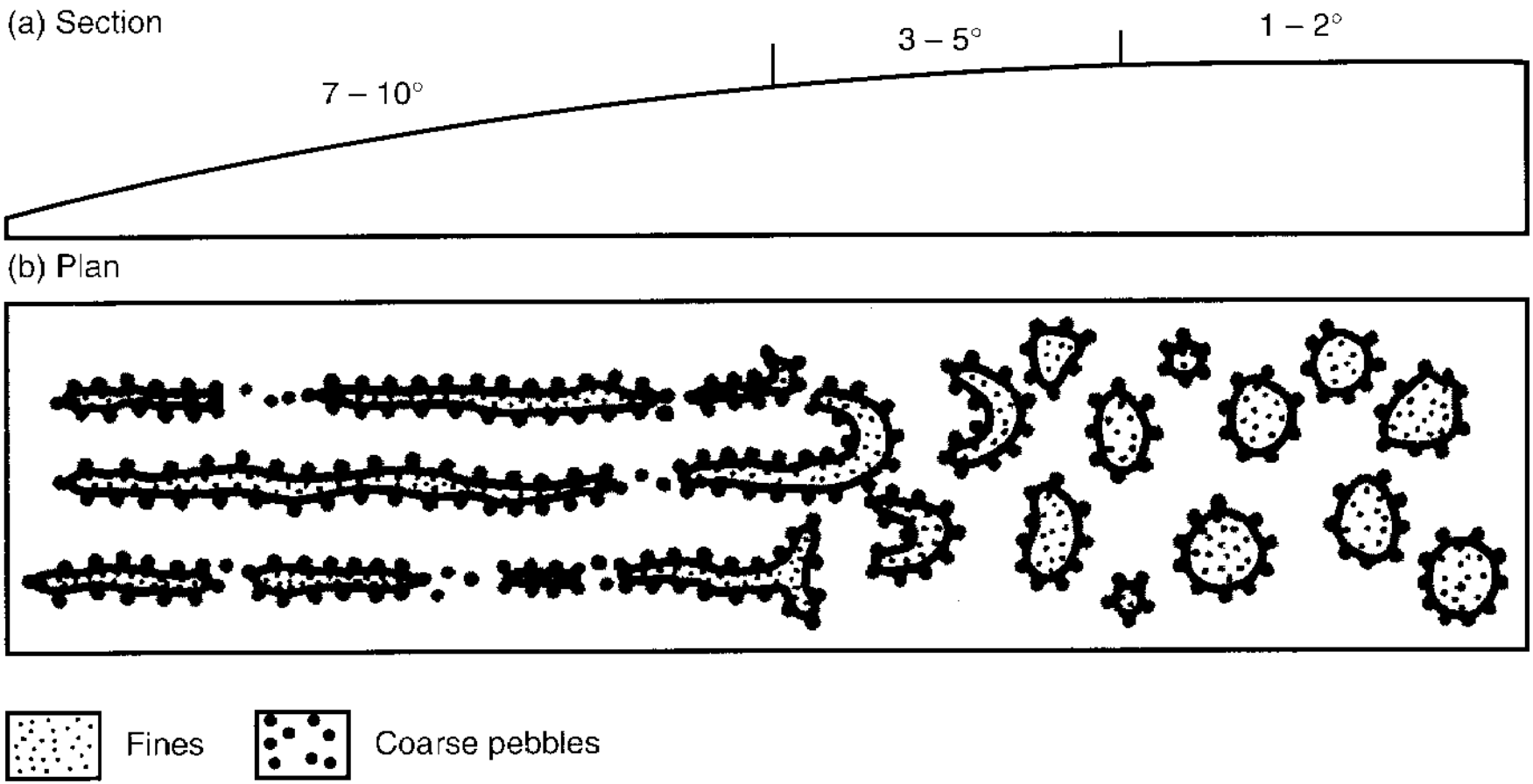


Figure 8.11 Diagram illustrating the change from circles to stripes as slope angle increases, according to J. Büdel (1960).


.....glaciation level.....
.....lower permafrost limit.....
.....lower periglacial limit.....