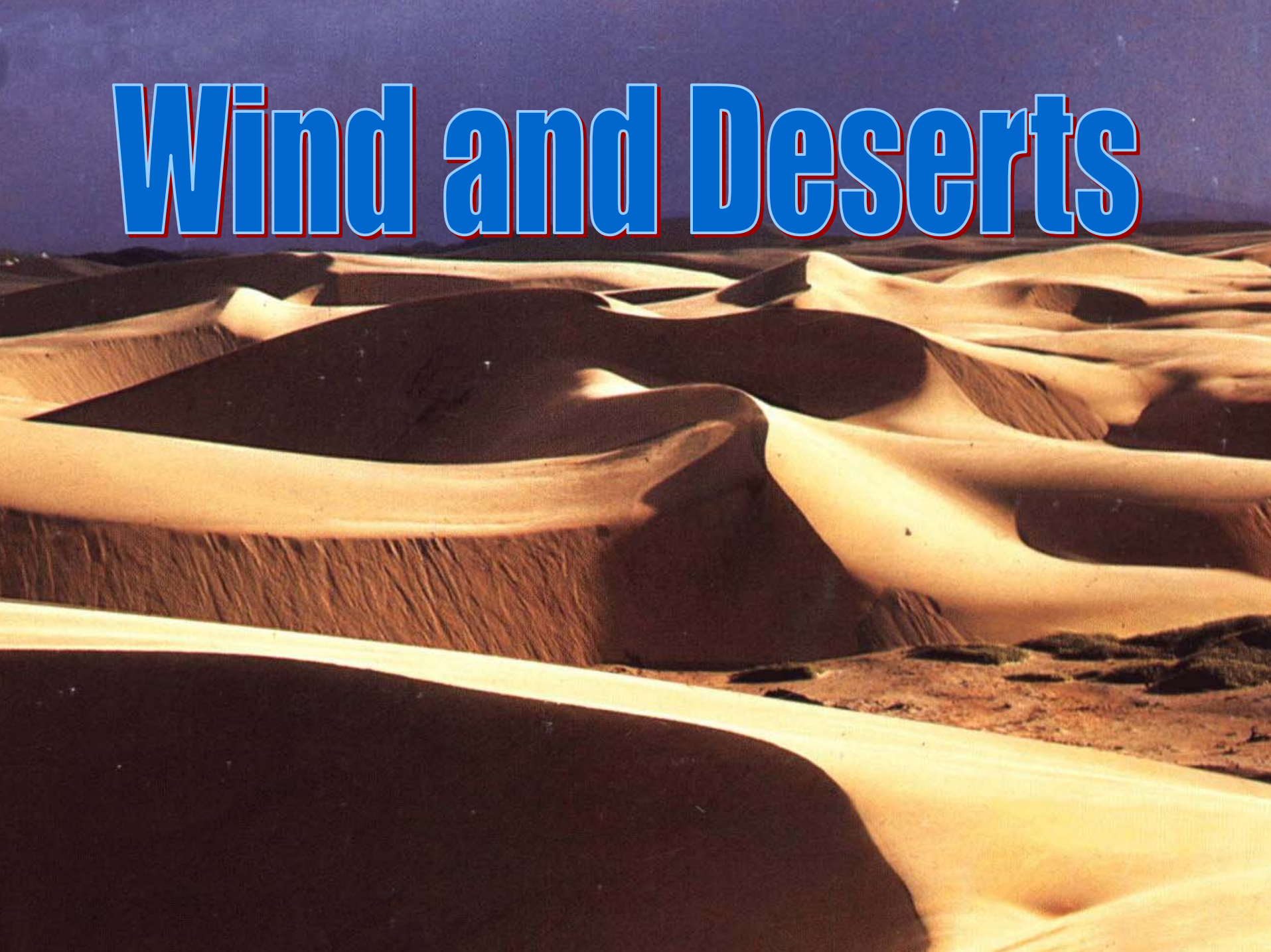
Wind and Deserts



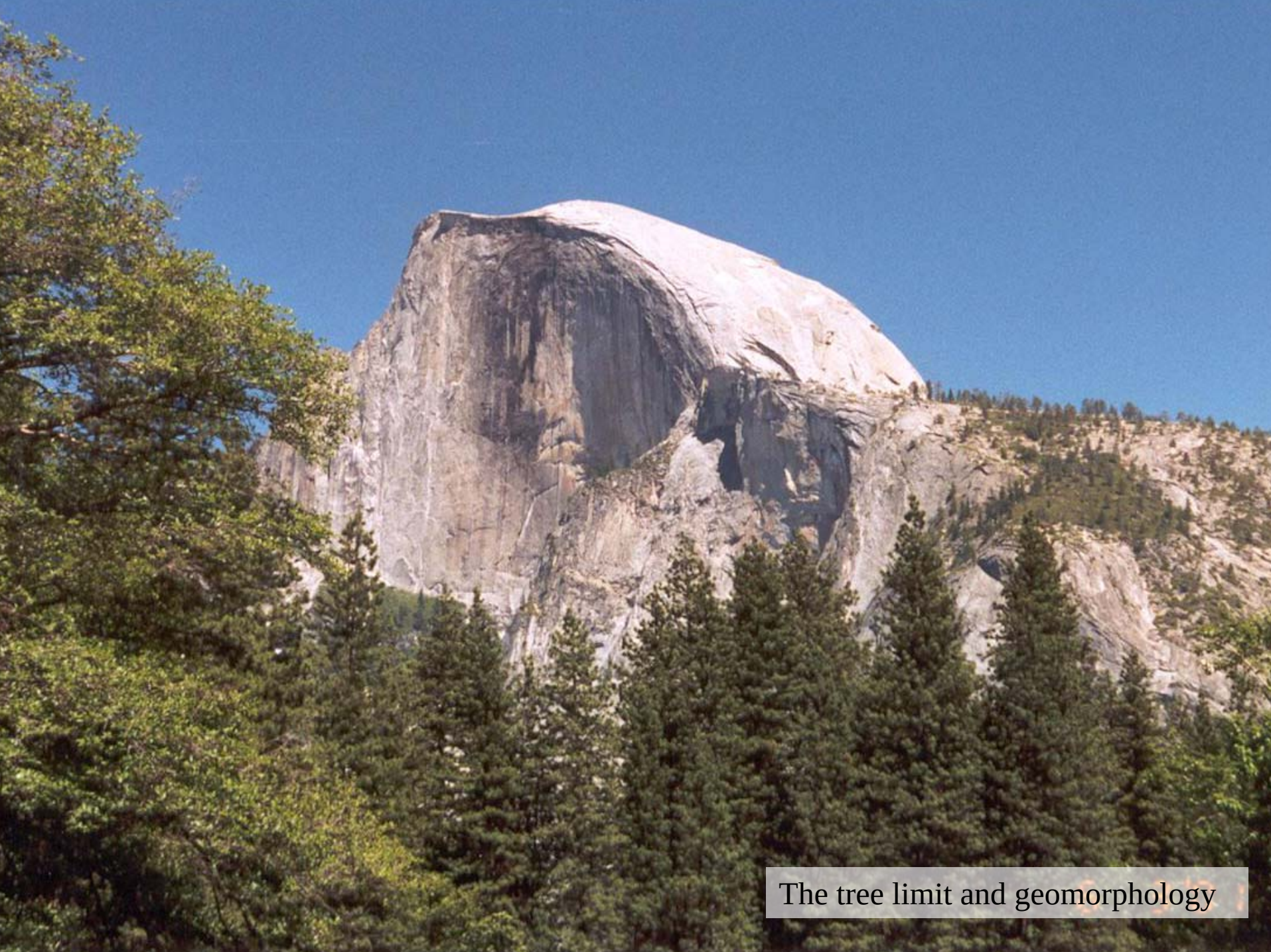
Wind and deserts

1: Global wind systems

2: Where to find wind activity ?

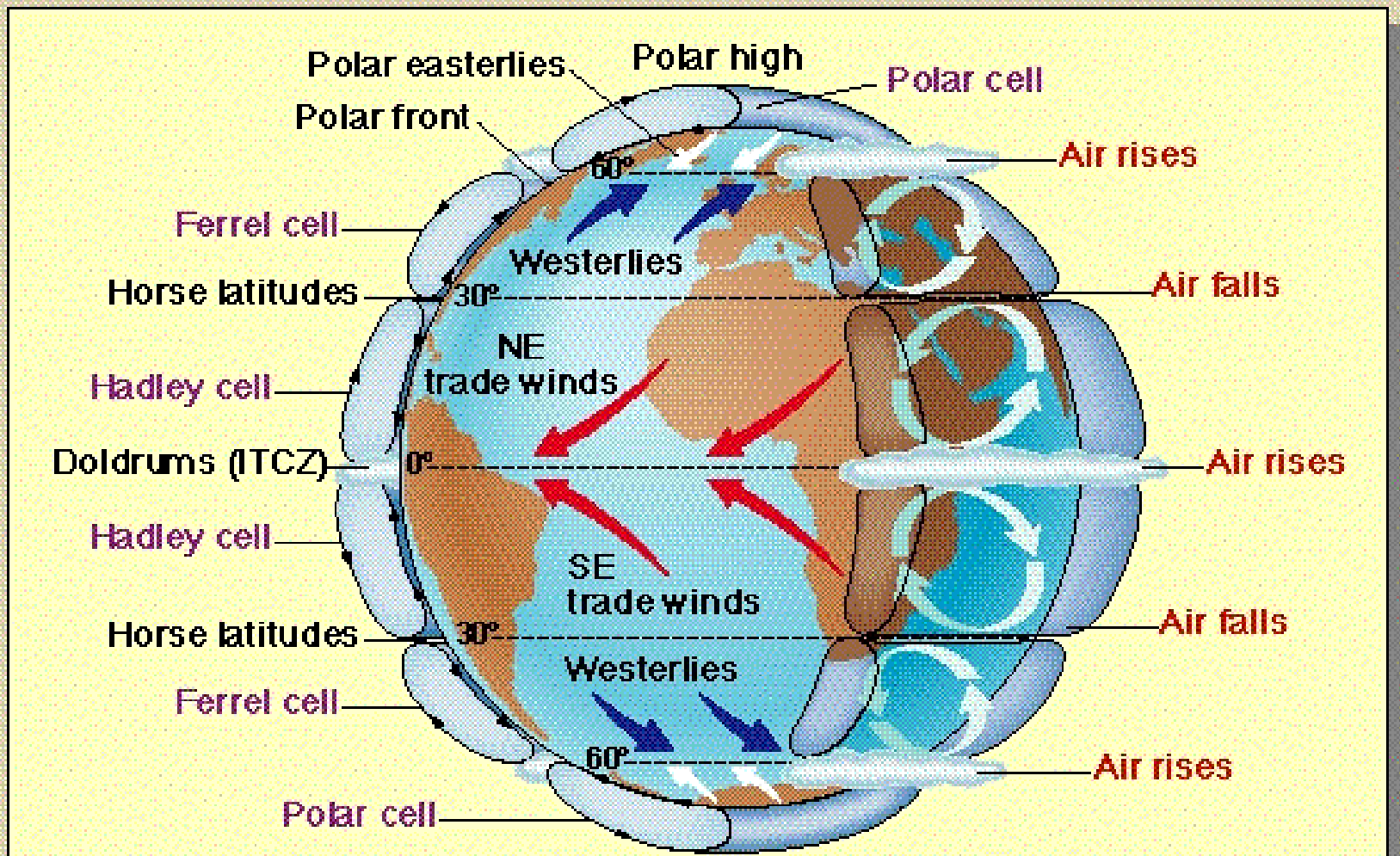
3: Where to find deserts ?

4: Eolian landforms

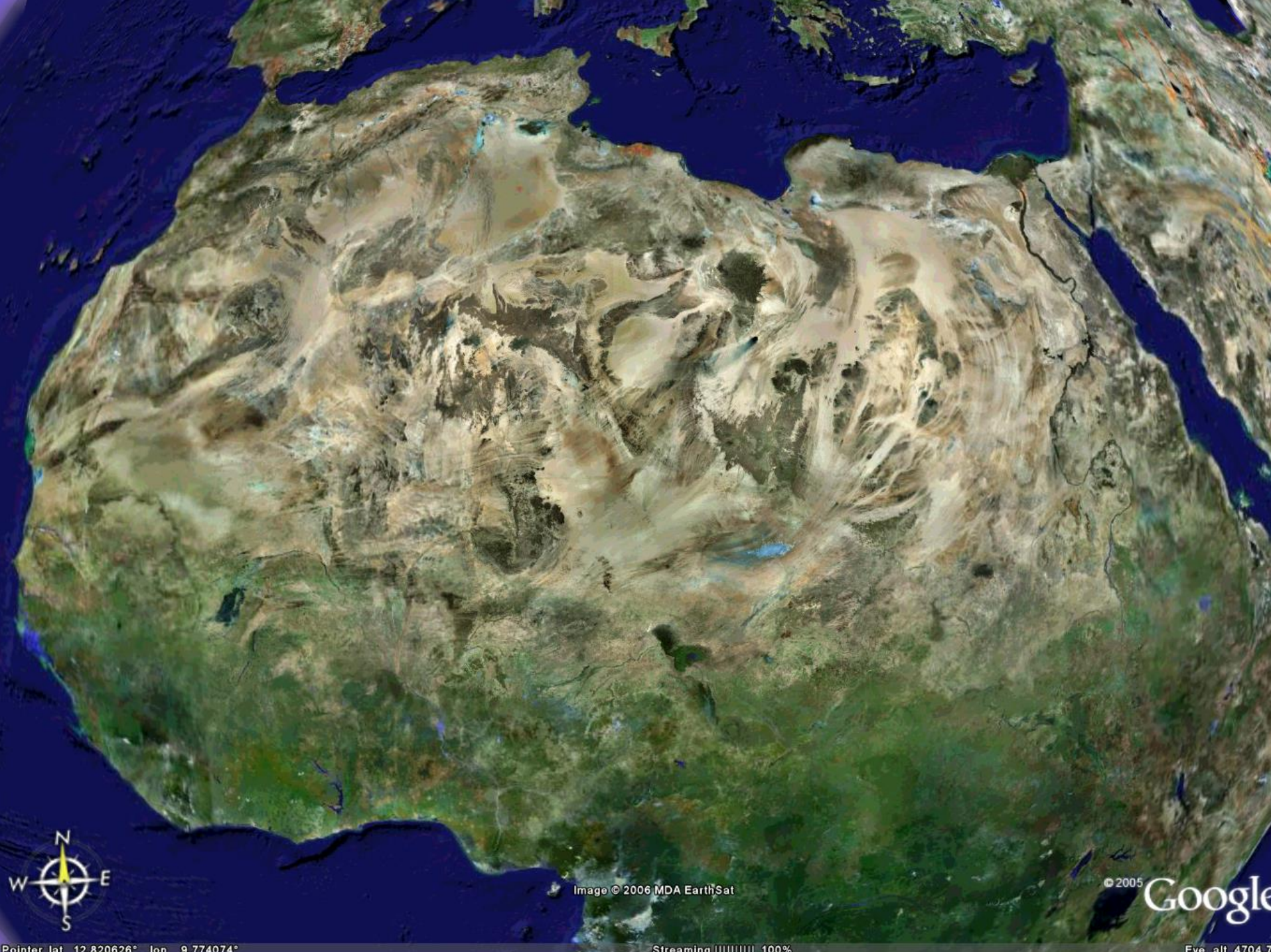

The tree limit and geomorphology


Copyright Tom Van Sant/The Geosphere Project

Global Air Circulation Patterns



Global air circulation as described in the three-cell circular model. As in simpler circulation models, air rises at the equator and falls at the poles. But instead of one great circuit in each hemisphere from equator to pole, there are three. Note the influence of the Coriolis effect on wind direction.


N
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S
Image © 2006 MDA EarthSat
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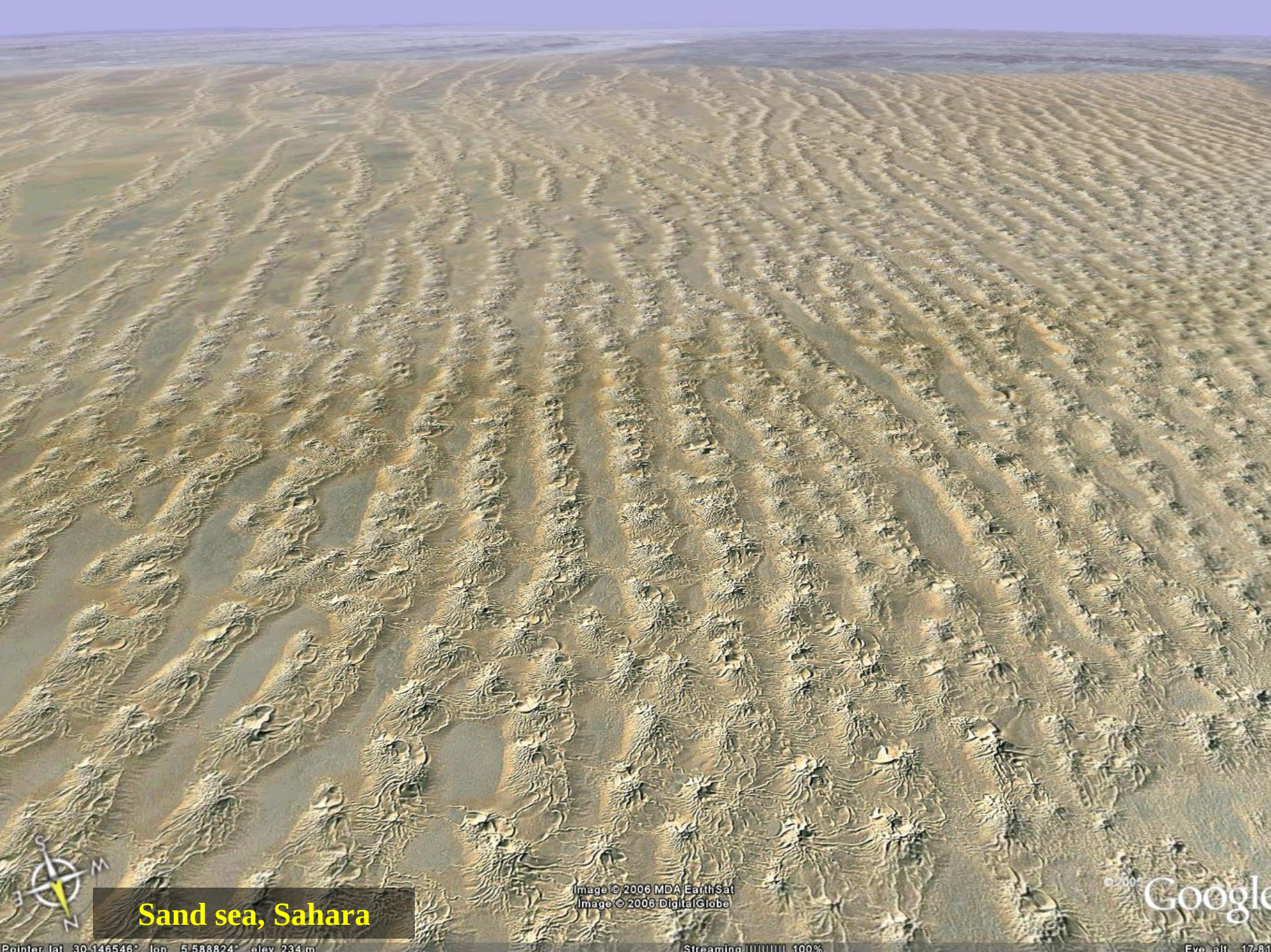
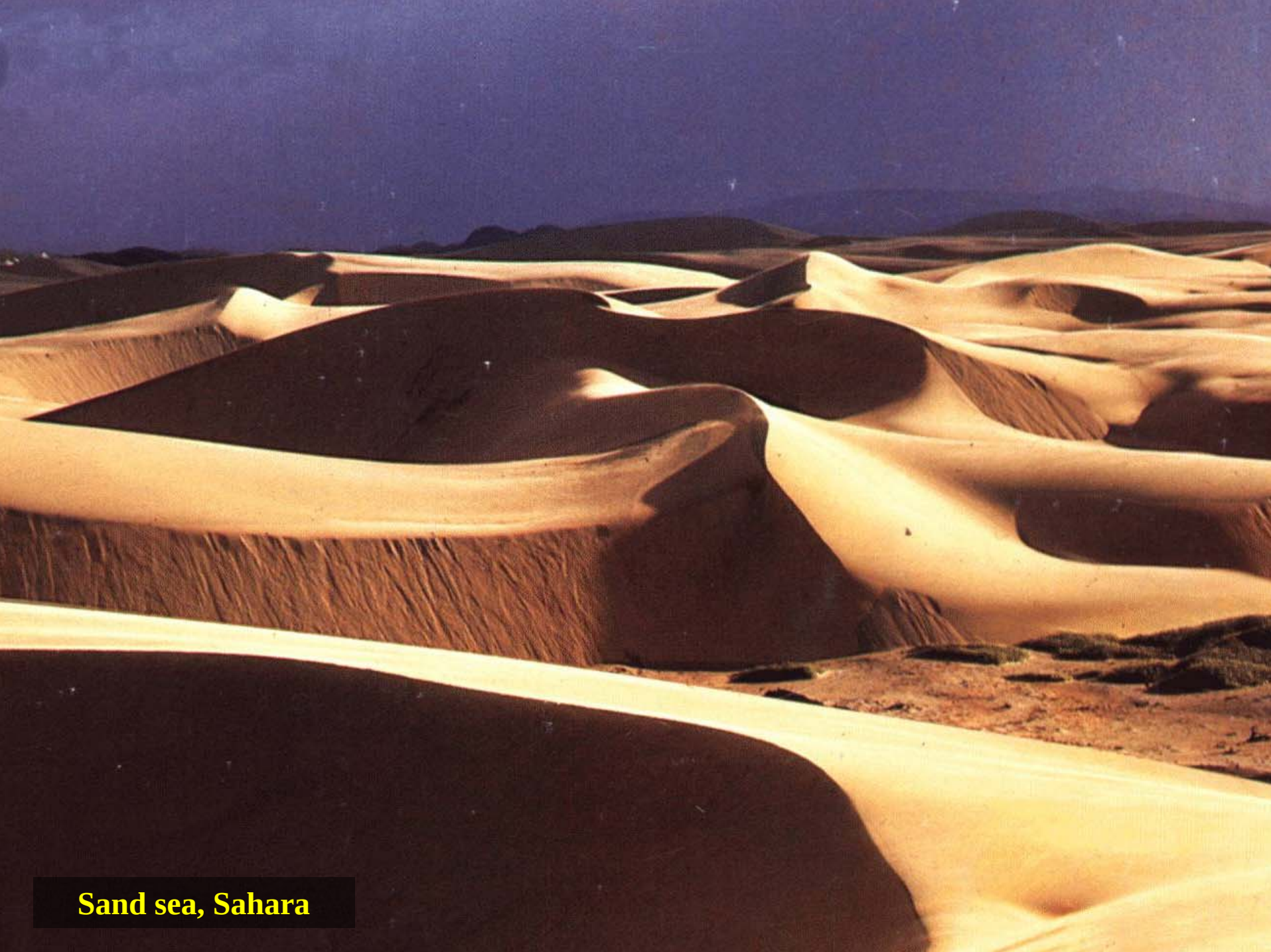
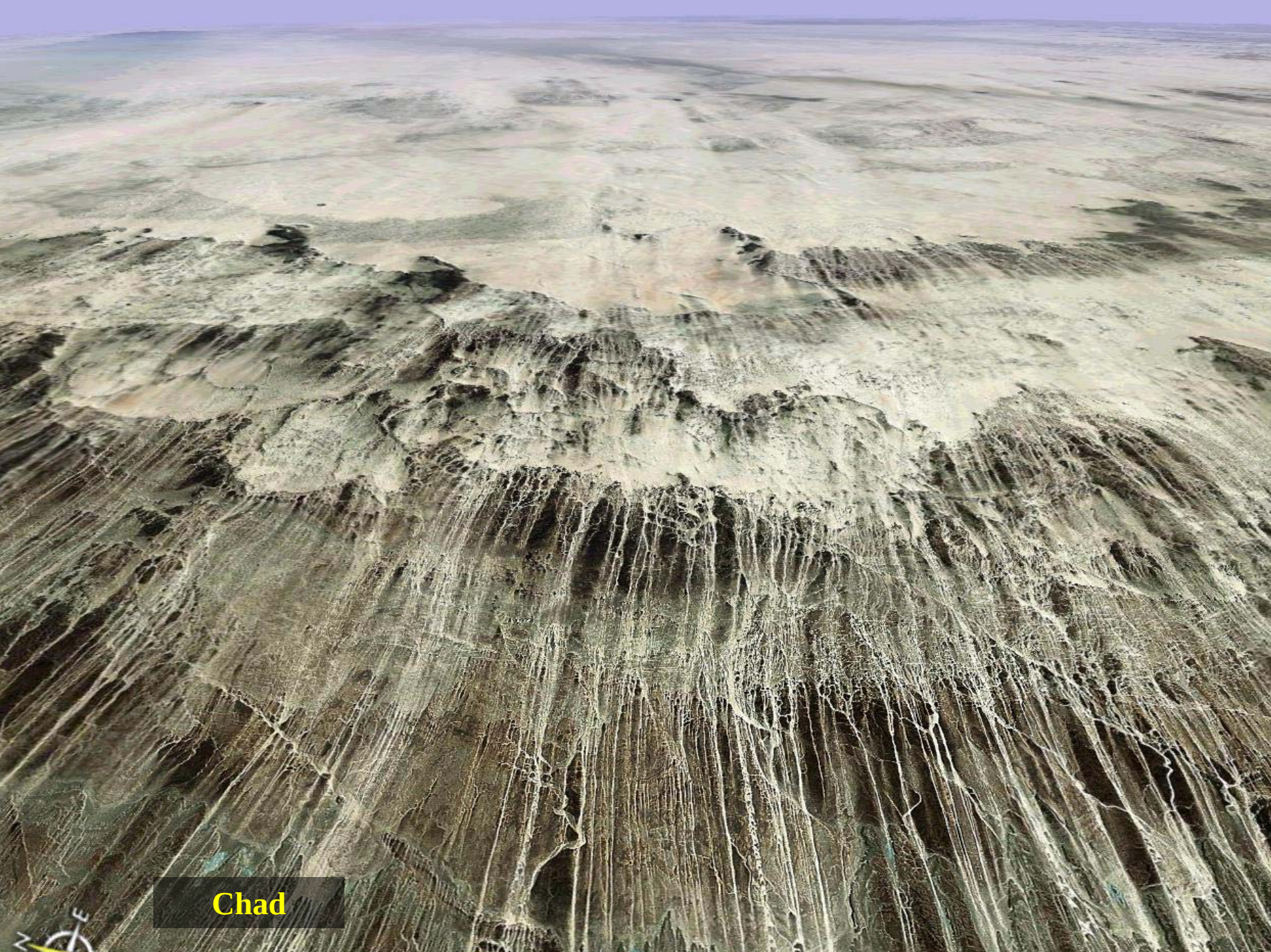

Sand sea, Sahara
Image © 2006 MDA EarthSat
Image © 2006 DigitalGlobe
Google
Pointer lat 30.146546° lon 5.588824° elev 234 m
Streaming 100%
Eye alt 17.81

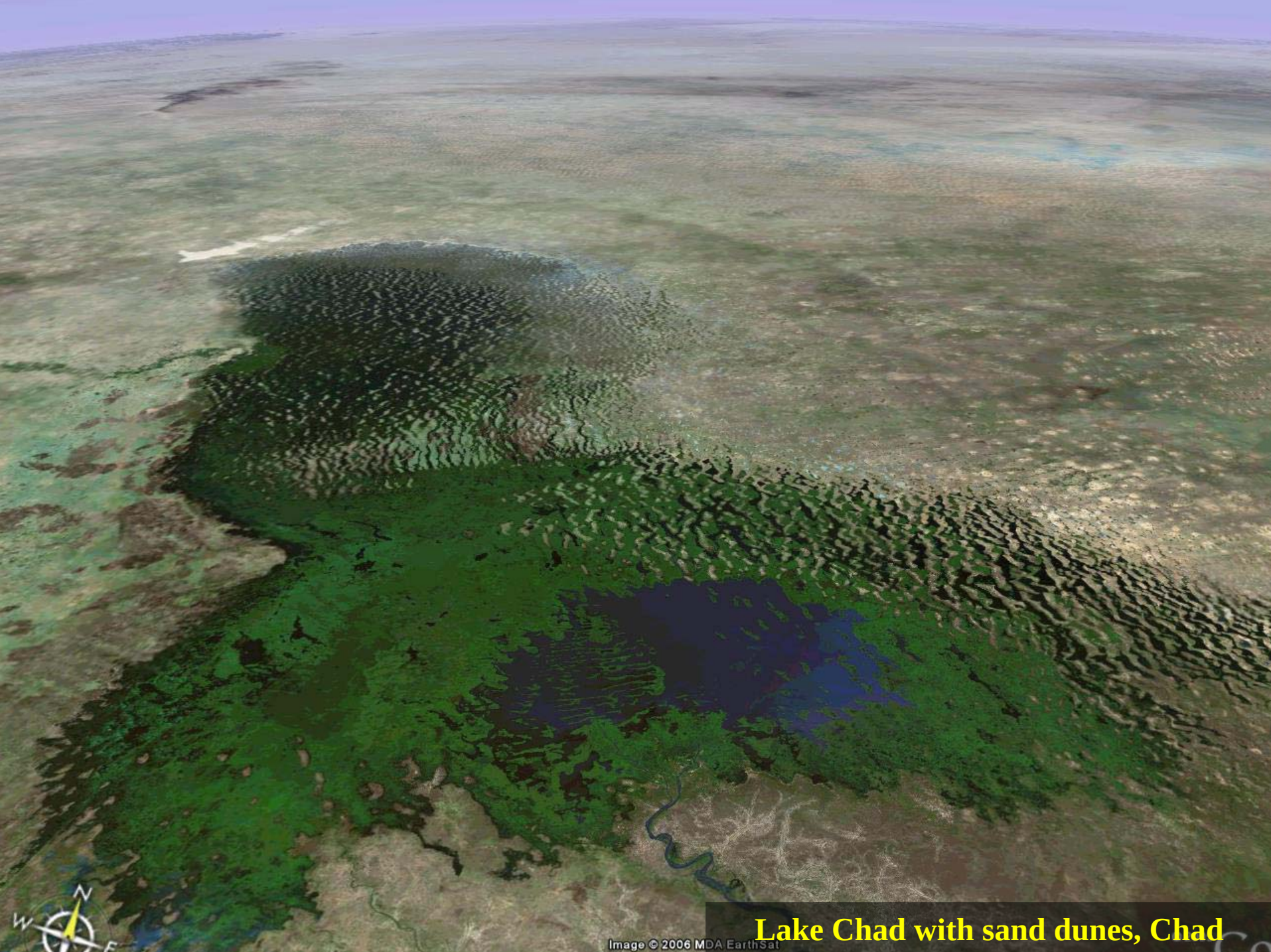

Sand sea, Sahara


Chad

Exposed bedrock, Hoggar mountains, central Sahara

Exposed bedrock, Hoggar mountains, Sahara


Chad, Tibesti, volano with fluvial relief
Image © 2006 MDA EarthSat



Lake Chad with sand dunes, Chad

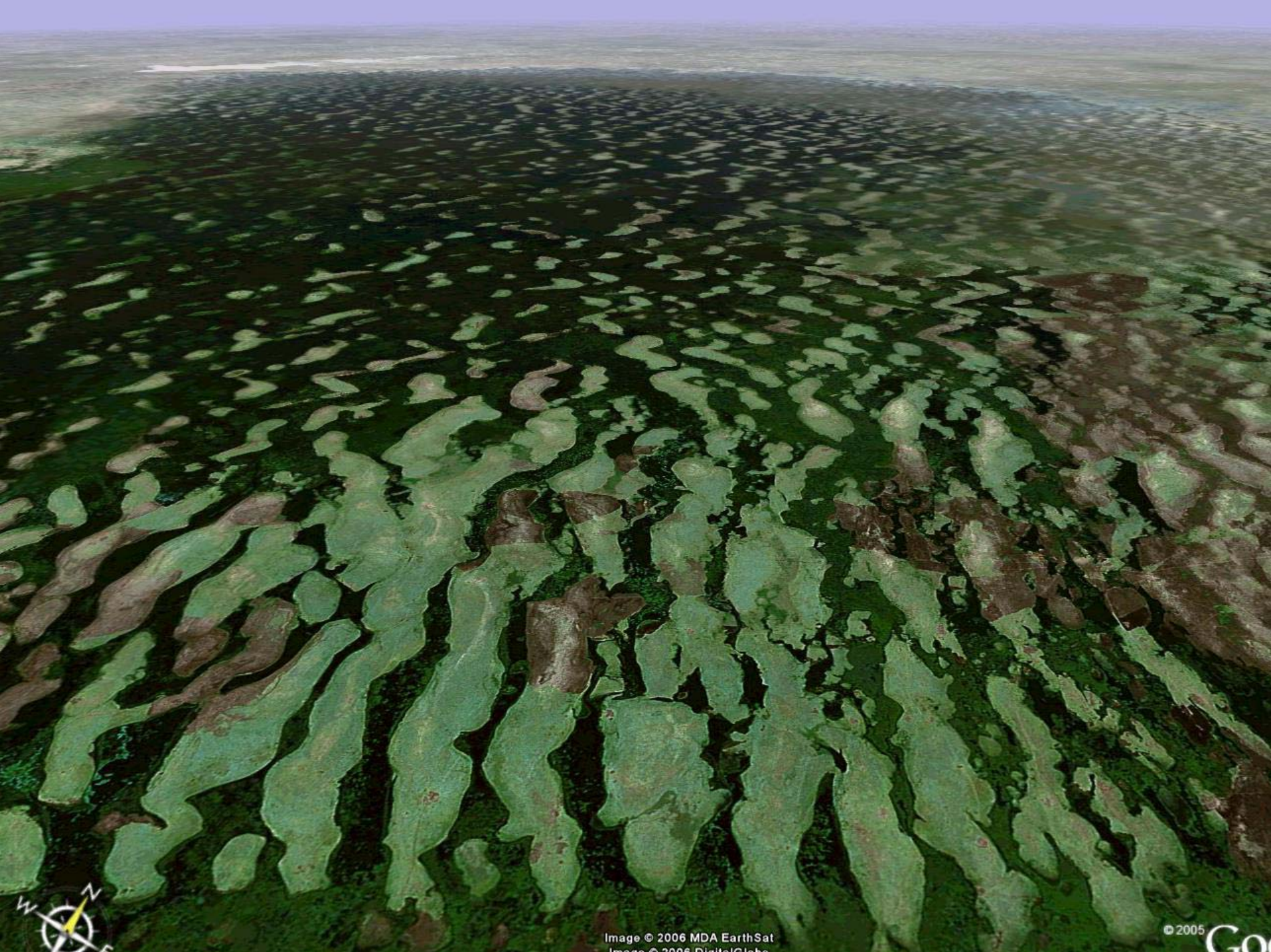


Image © 2006 MDA EarthSat
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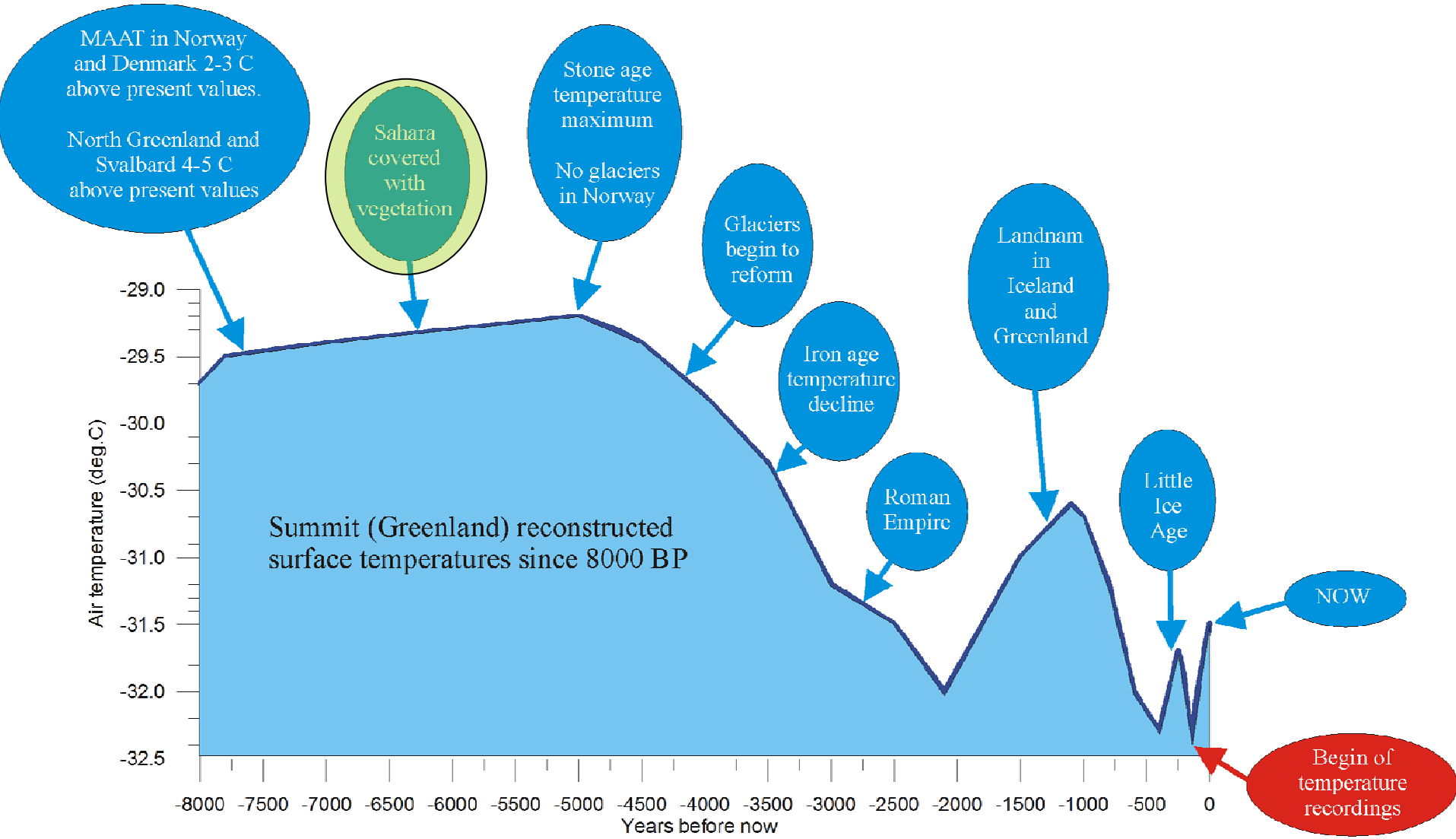
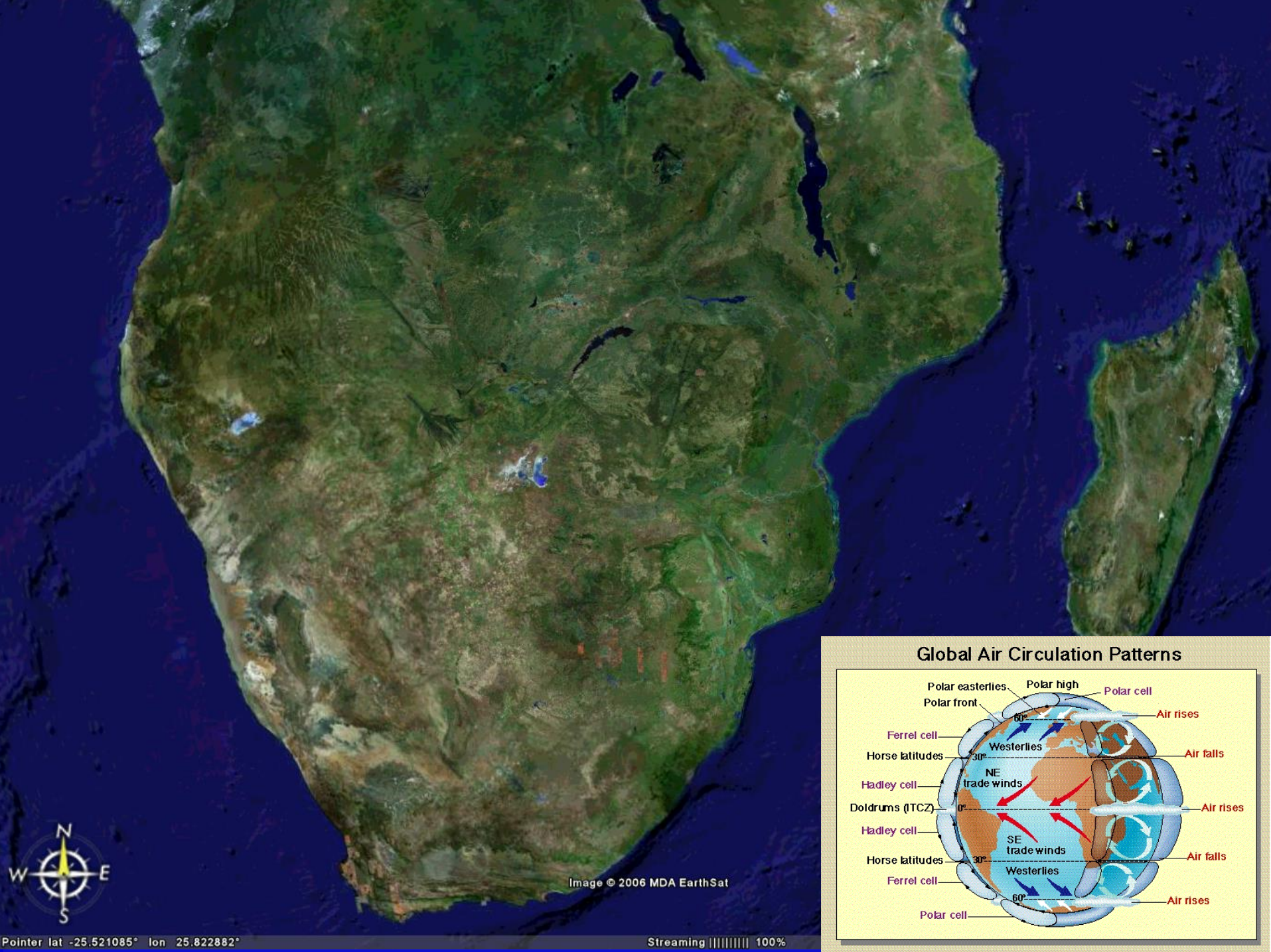
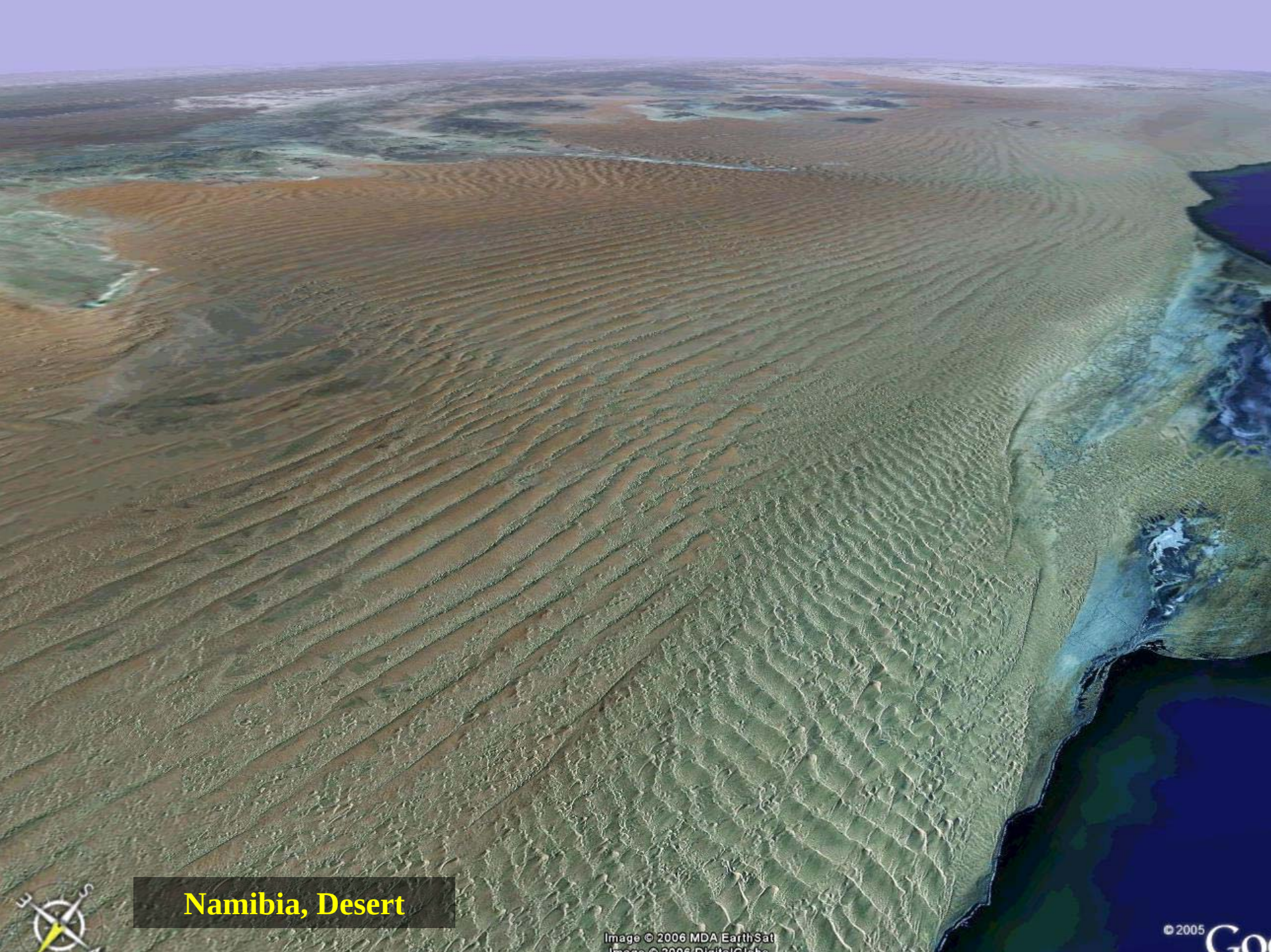

MAAT in Norway and Denmark 2-3 C above present values.
North Greenland and Svalbard 4-5 C above present values
Sahara covered with vegetation
Stone age temperature maximum
No glaciers in Norway
Glaciers begin to reform
Iron age temperature decline
Roman Empire
Landnam in Iceland and Greenland
Little Ice Age
NOW
Begin of temperature recordings
Summit (Greenland) reconstructed surface temperatures since 8000 BP
Air temperature (deg.C)
-29.0
-29.5
-30.0
-30.5
-31.0
-31.5
-32.0
-32.5
-8000 -7500 -7000 -6500 -6000 -5500 -5000 -4500 -4000 -3500 -3000 -2500 -2000 -1500 -1000 -500 0
Years before now



Global Air Circulation Patterns


Namibia, Desert
Image © 2006 MDA EarthSat
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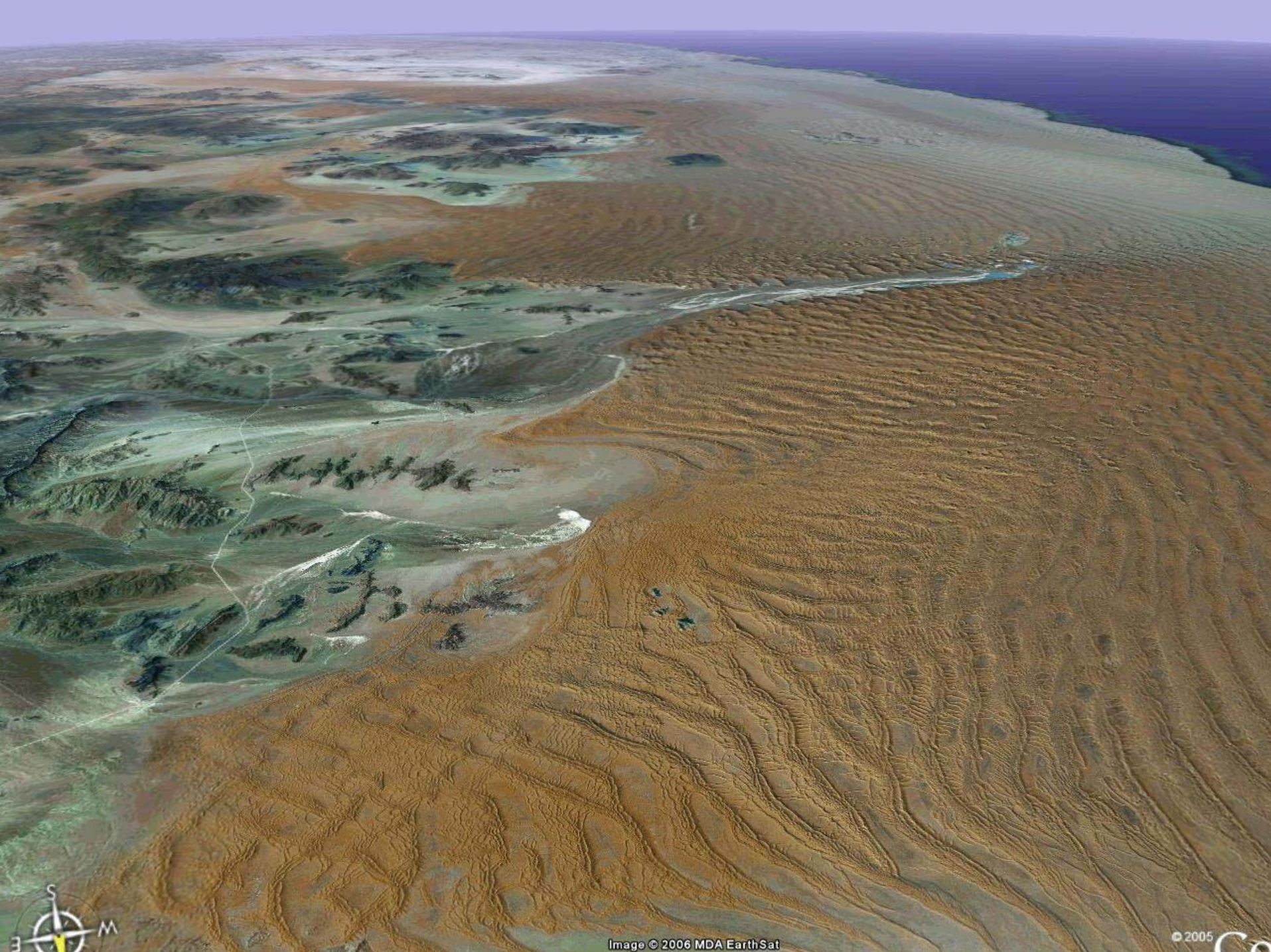
Image © 2006 MDA EarthSat
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Botswana, Okvango swamps with old sand dunes
Image © 2006 MDA EarthSat


N
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Image © 2005 MDA EarthSat
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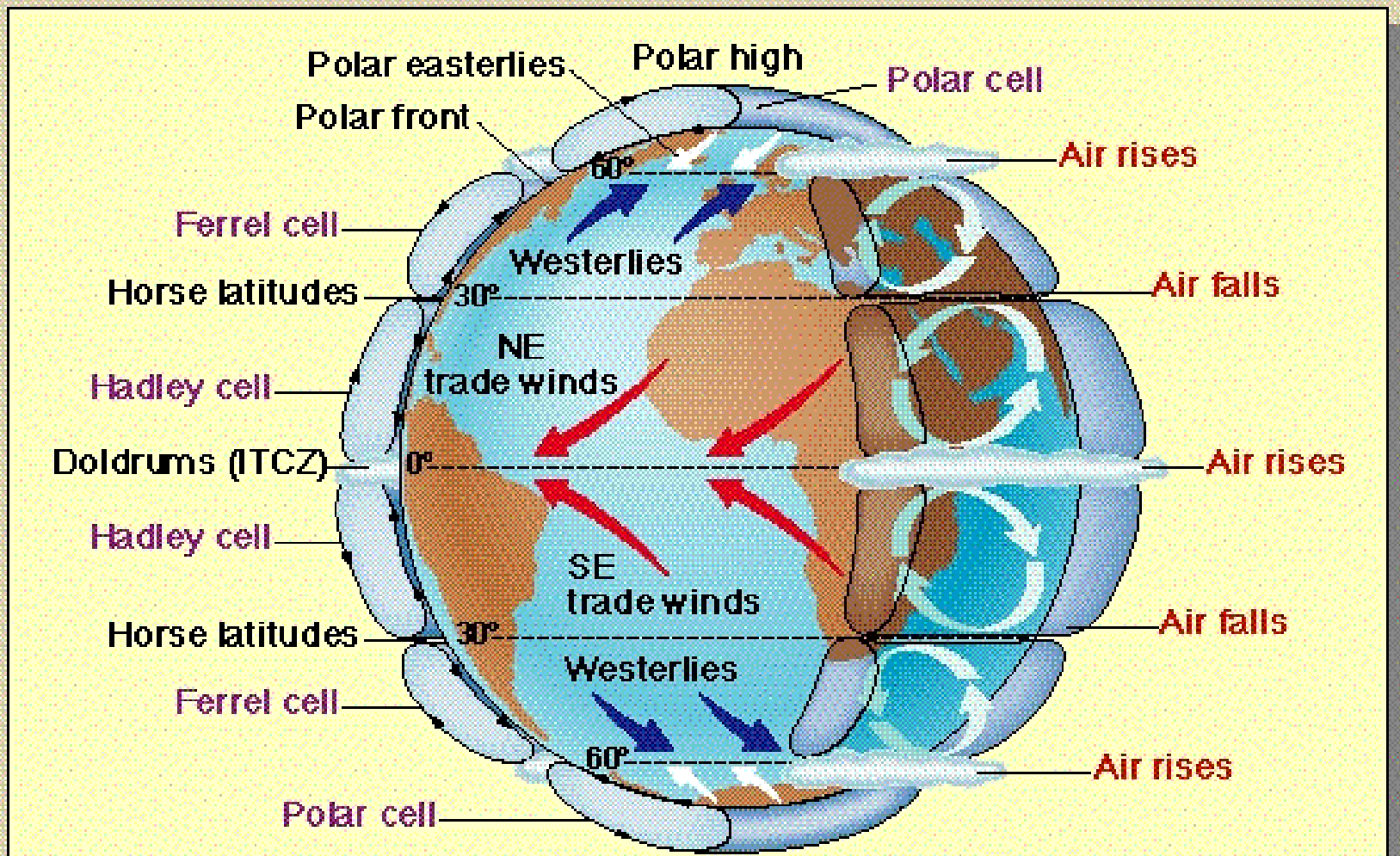
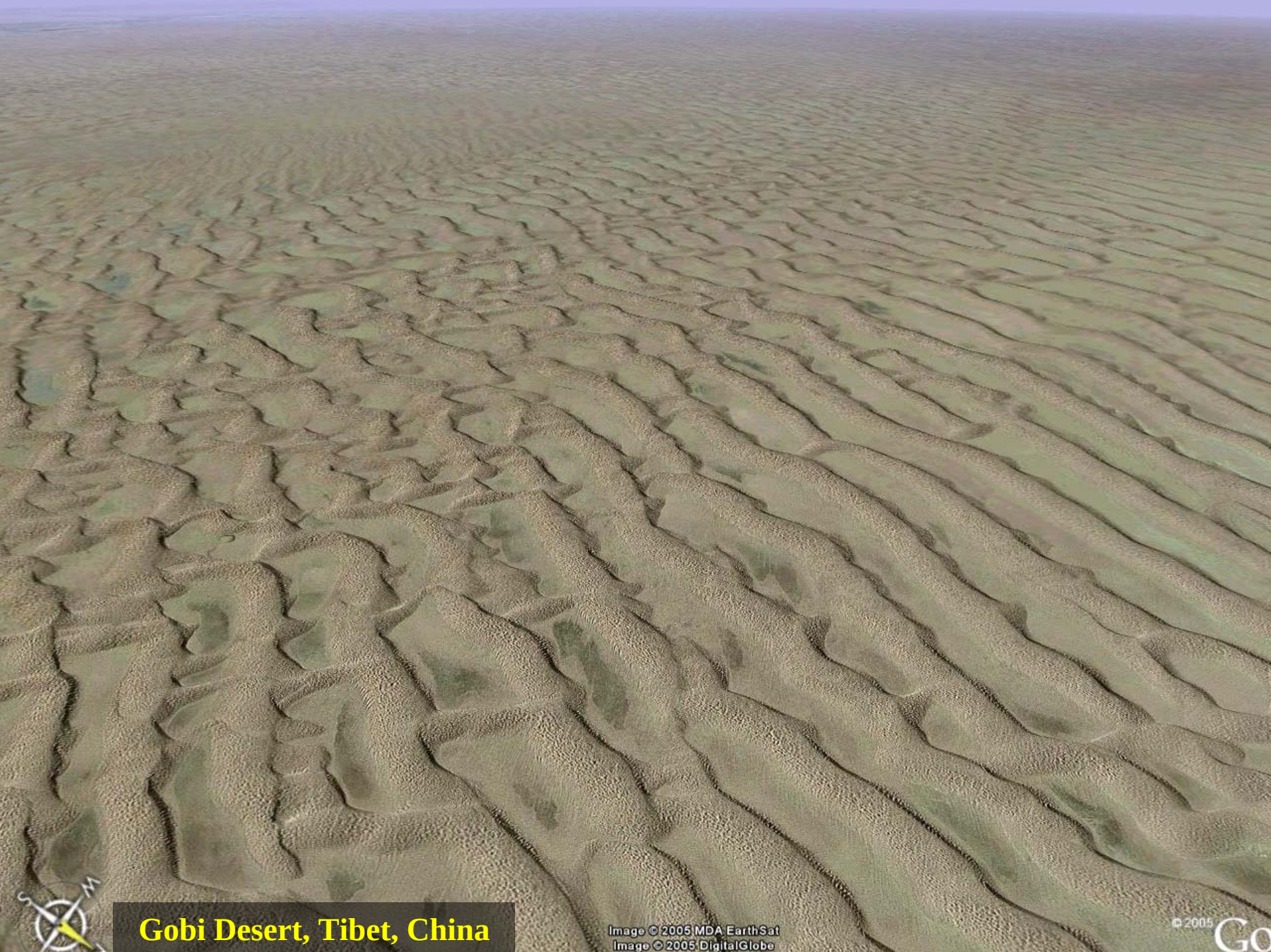
Global Air Circulation Patterns



Global air circulation as described in the three-cell circular model. As in simpler circulation models, air rises at the equator and falls at the poles. But instead of one great circuit in each hemisphere from equator to pole, there are three. Note the influence of the Coriolis effect on wind direction.


Gobi Desert, Tibet, China
Image © 2005 MDA EarthSat
Image © 2005 DigitalGlobe
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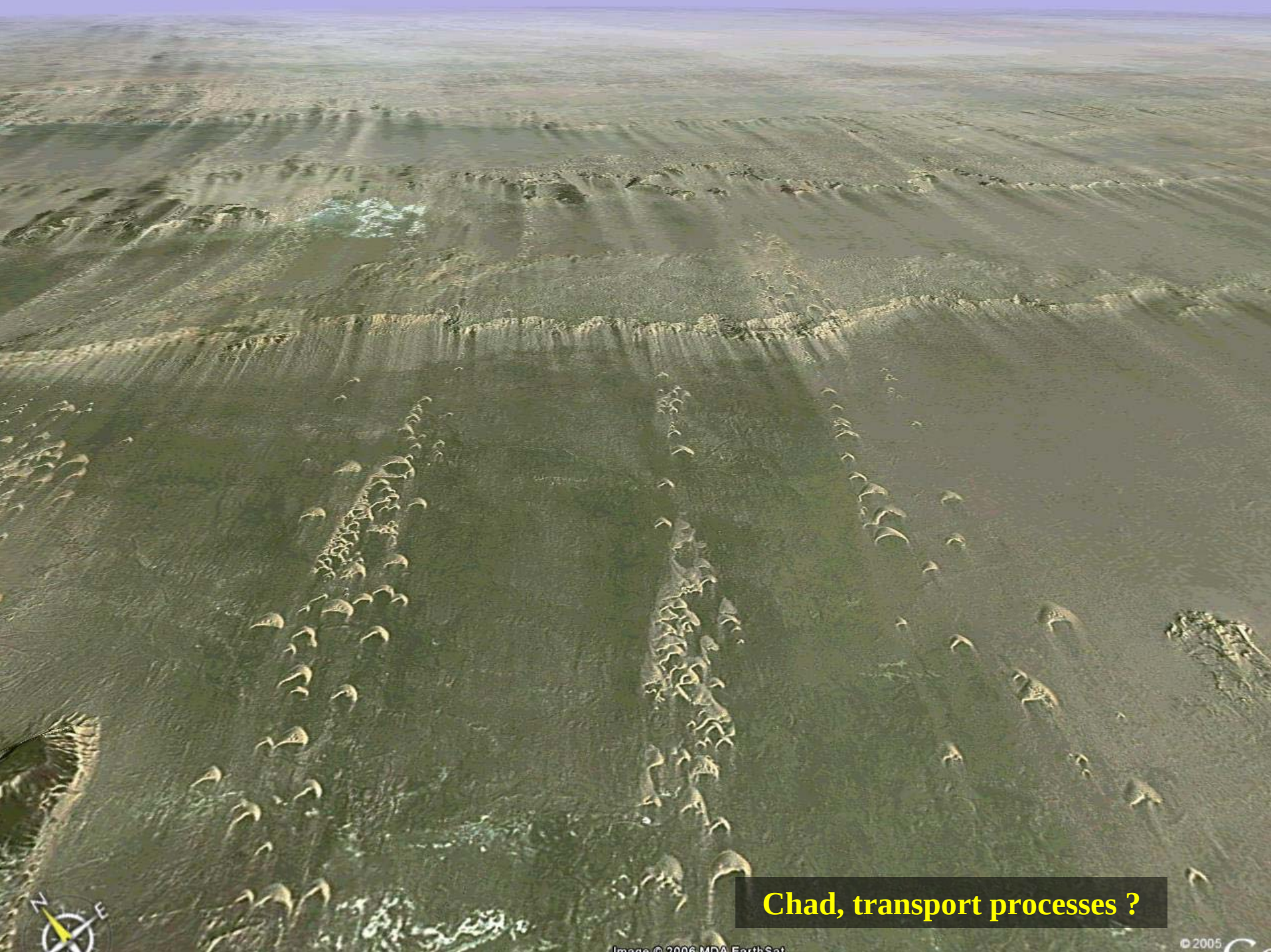
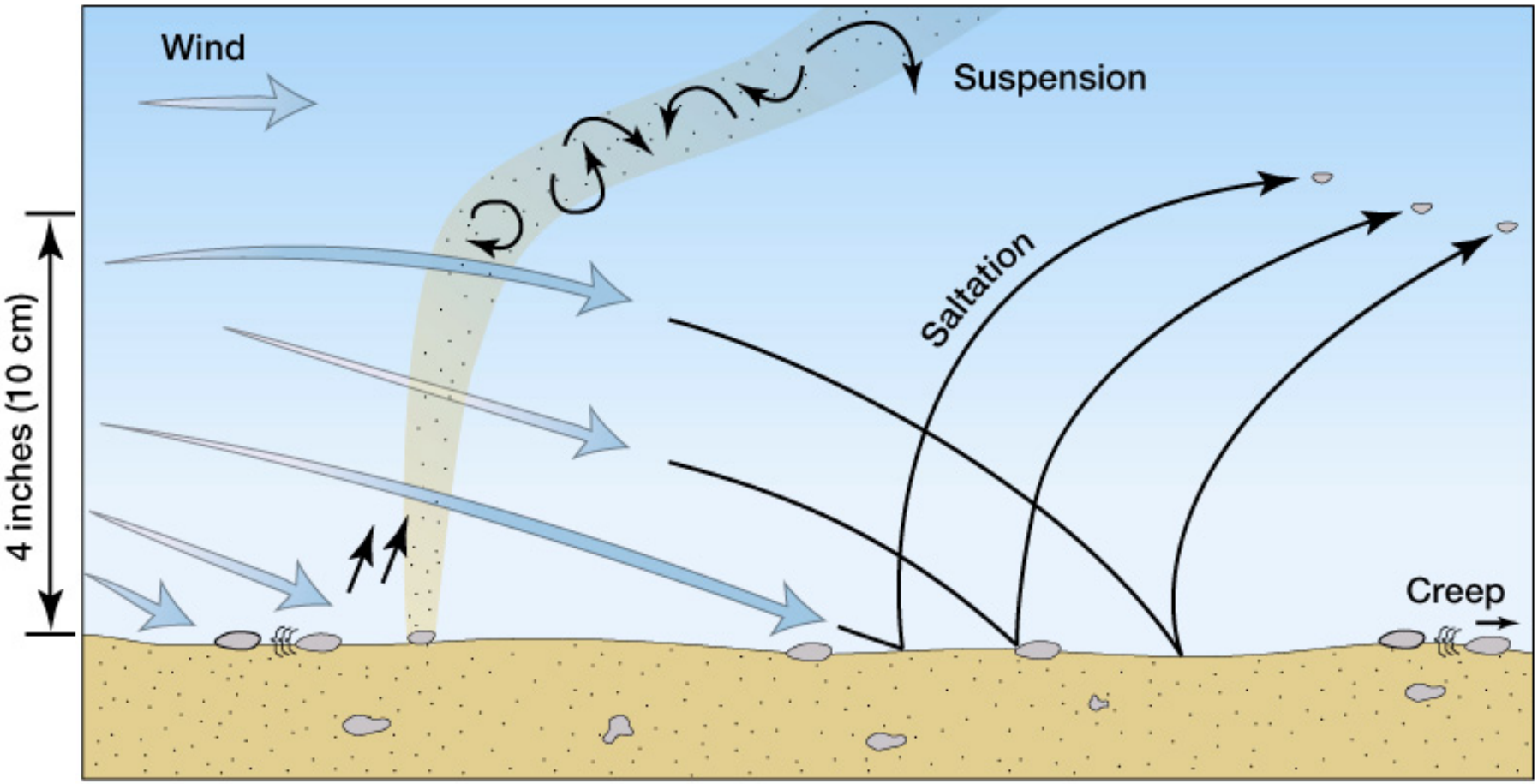
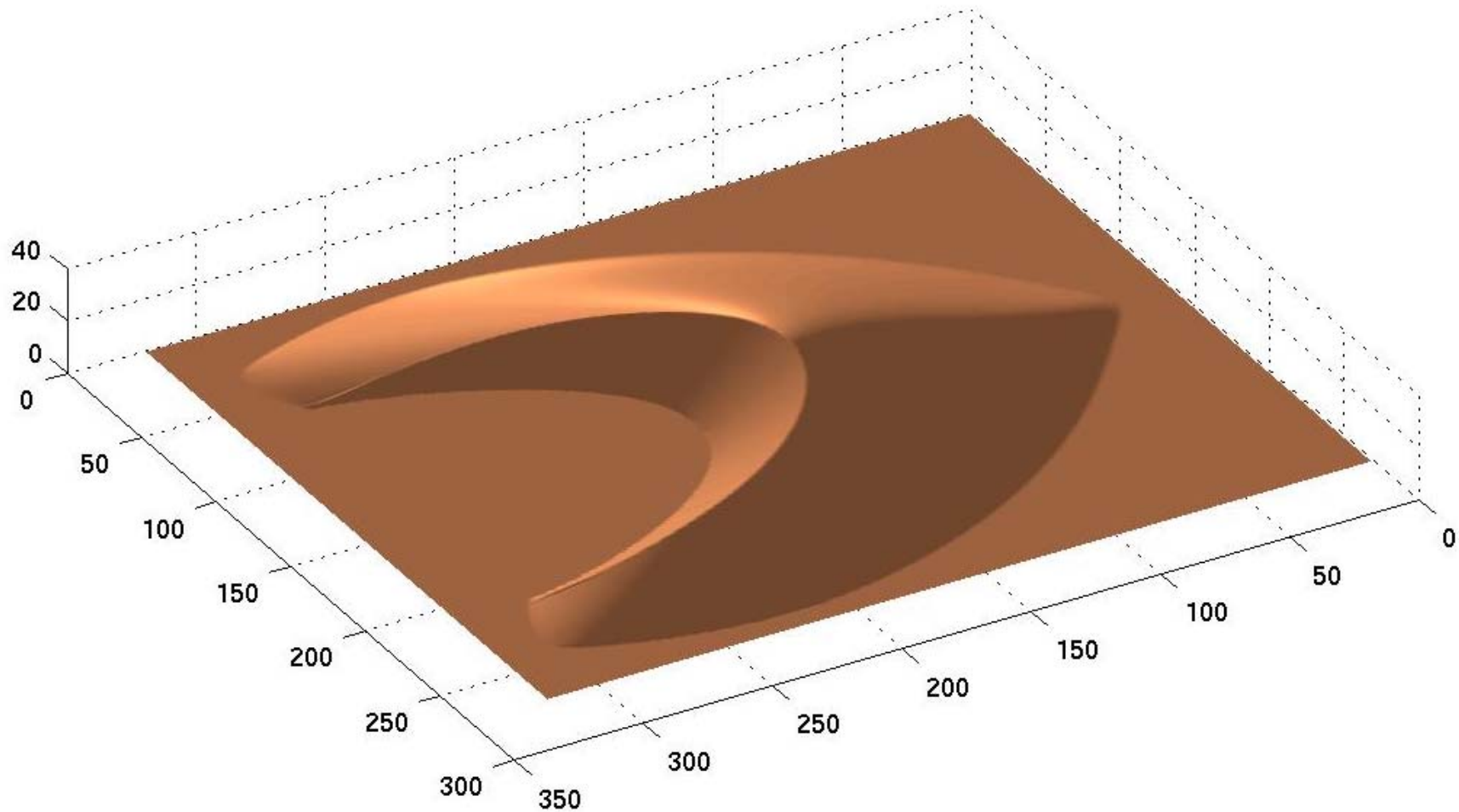
Deserted city, Gobi Desert, Tibet, China


Chad, transport processes ?
Image © 2006 MDA EarthSat
© 2005



Wind transport

Sand ripples



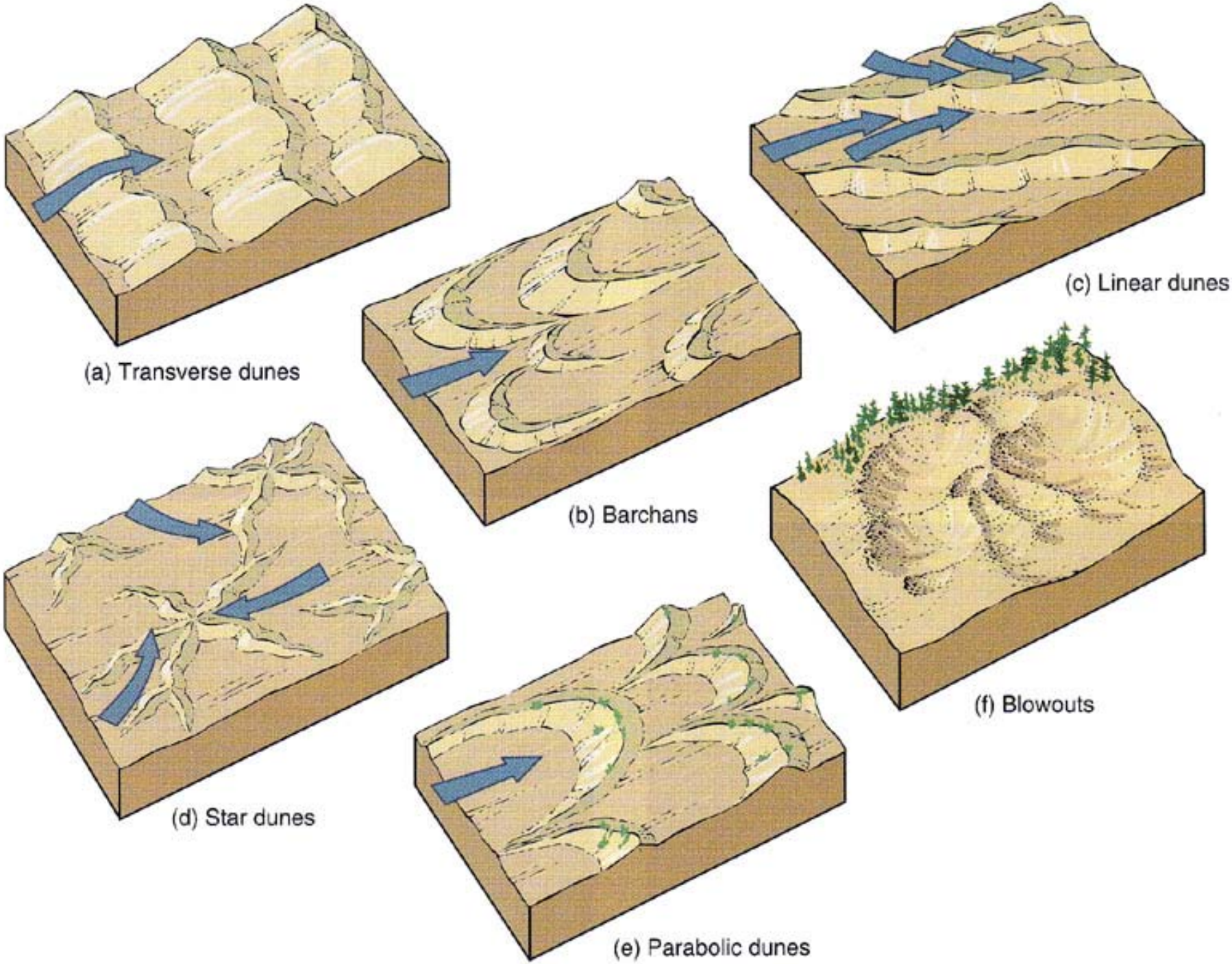
Barchan

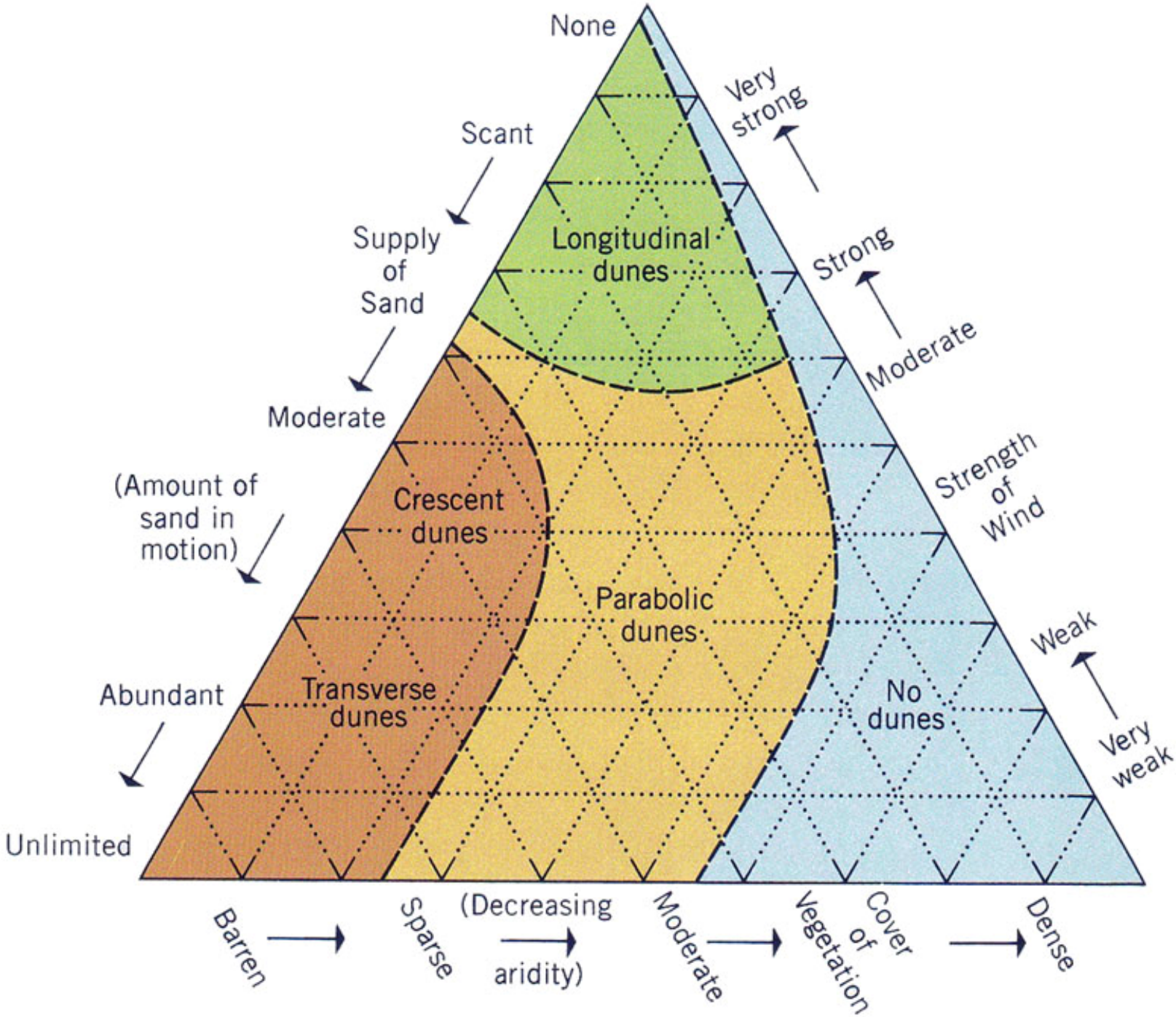
Drifting snow, Adventdalen, Spitsbergen

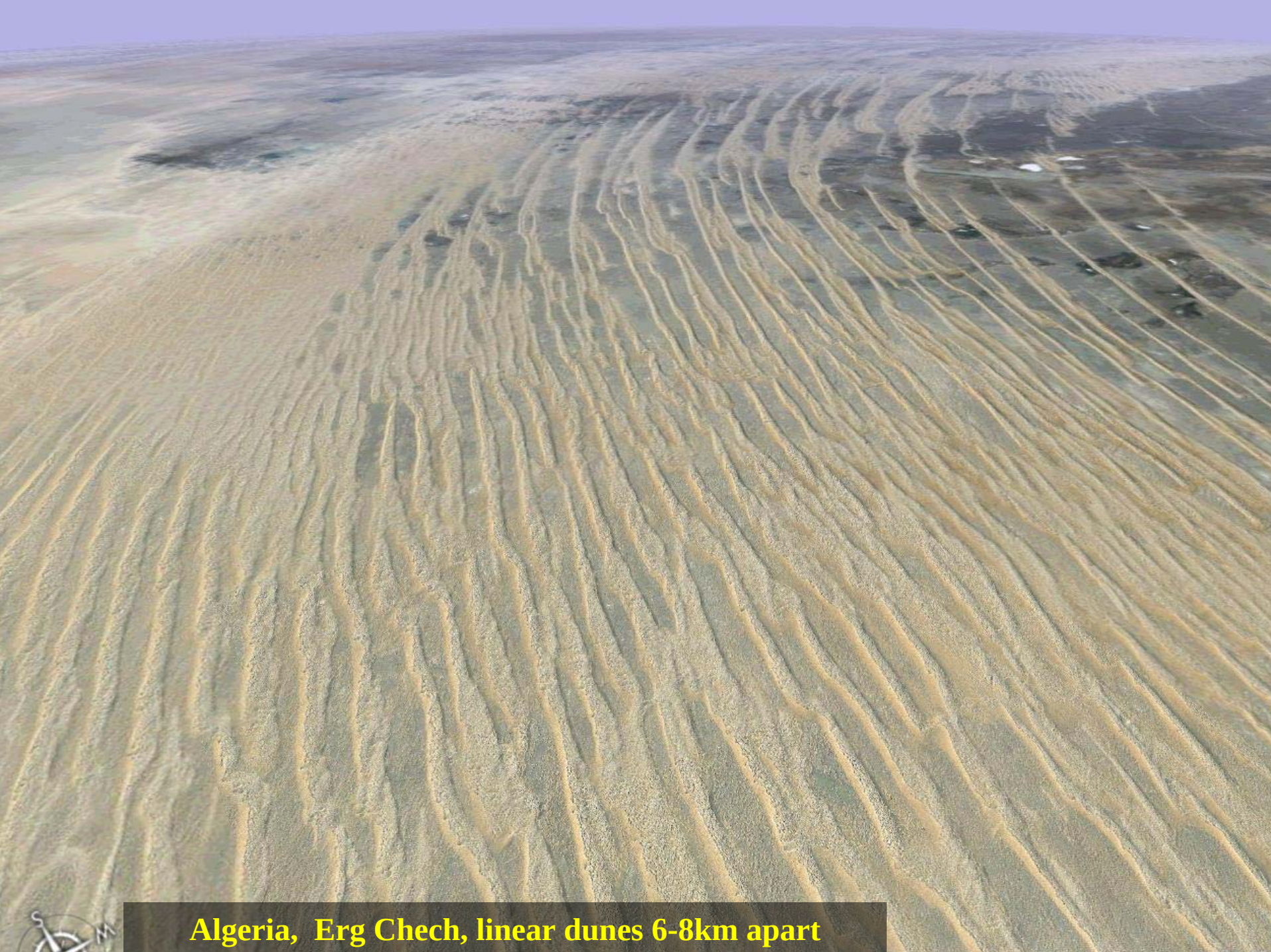
Snow dunes, Svalbard


Snow dunes, Svalbard

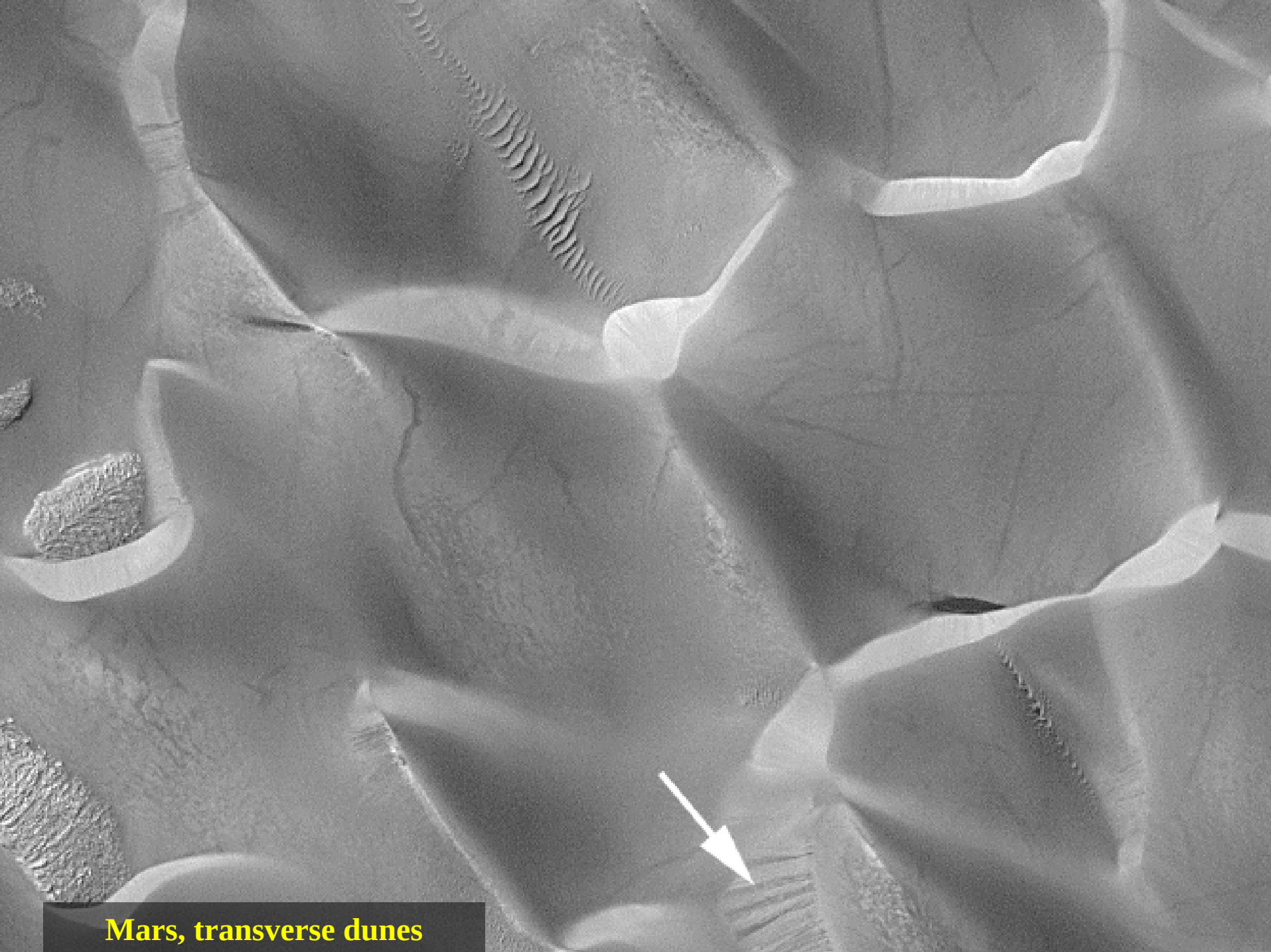
Sand dune, Death Valley, USA


(a) Transverse dunes
(b) Barchans
(c) Linear dunes
(d) Star dunes
(e) Parabolic dunes
(f) Blowouts


None
Very strong
Scant
Supply of Sand
Longitudinal dunes
Strong
Moderate
Moderate
Strength of Wind
(Amount of sand in motion)
Crescent dunes
Parabolic dunes
Weak
Abundant
Transverse dunes
No dunes
Very weak
Unlimited
Barren
Sparse
(Decreasing aridity)
Moderate
Cover of Vegetation
Dense

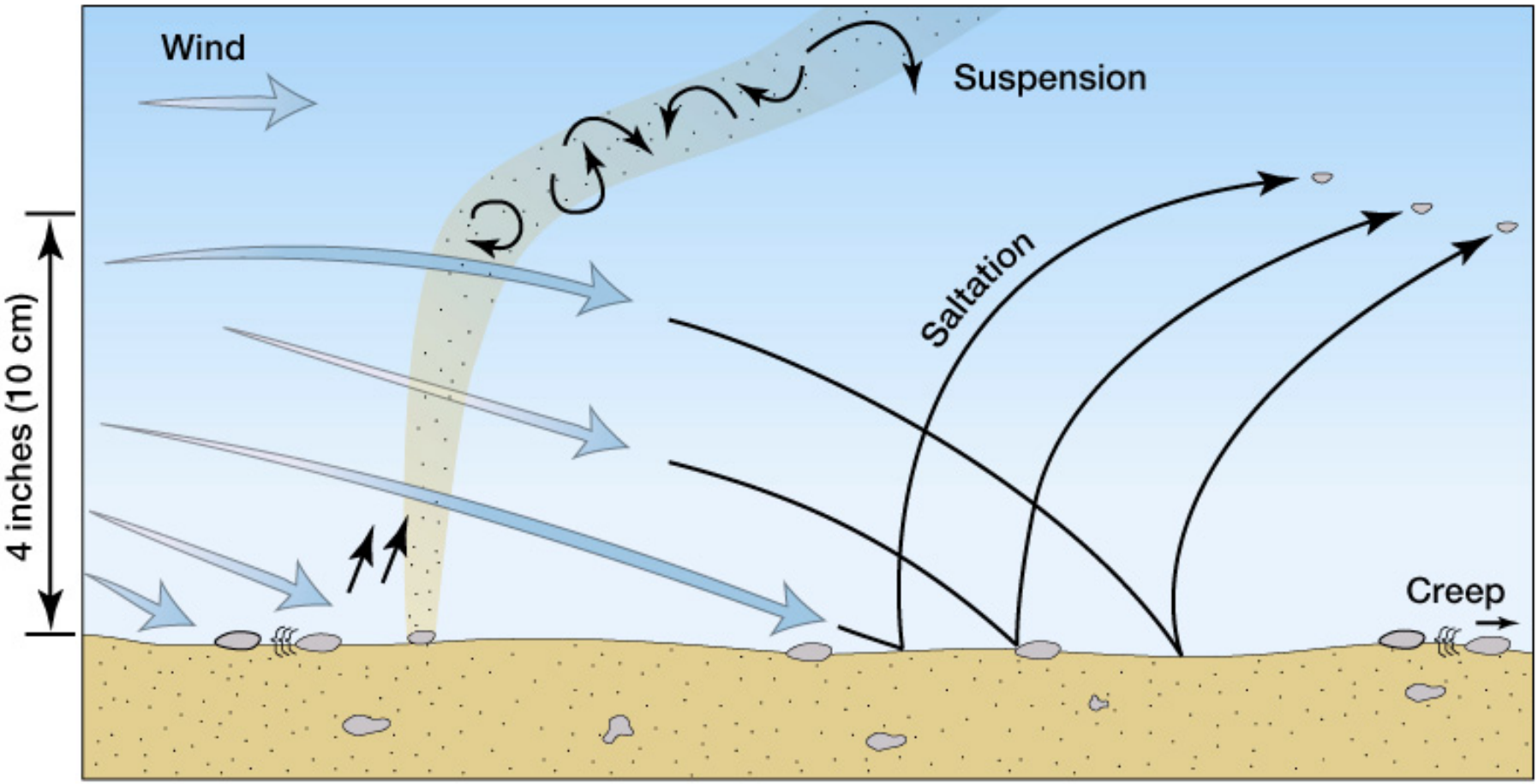


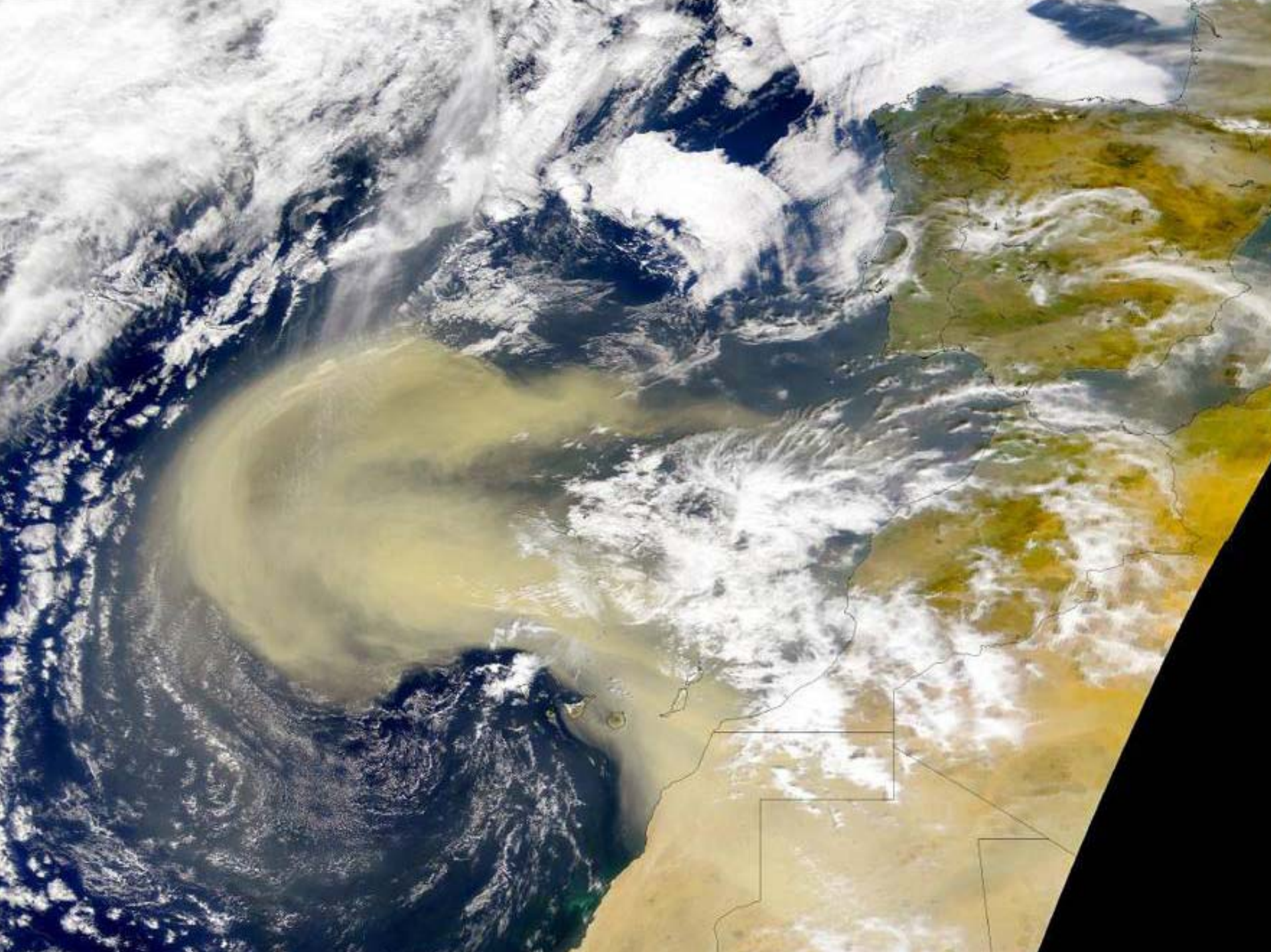
Algeria, Erg Chech, linear dunes 6-8km apart

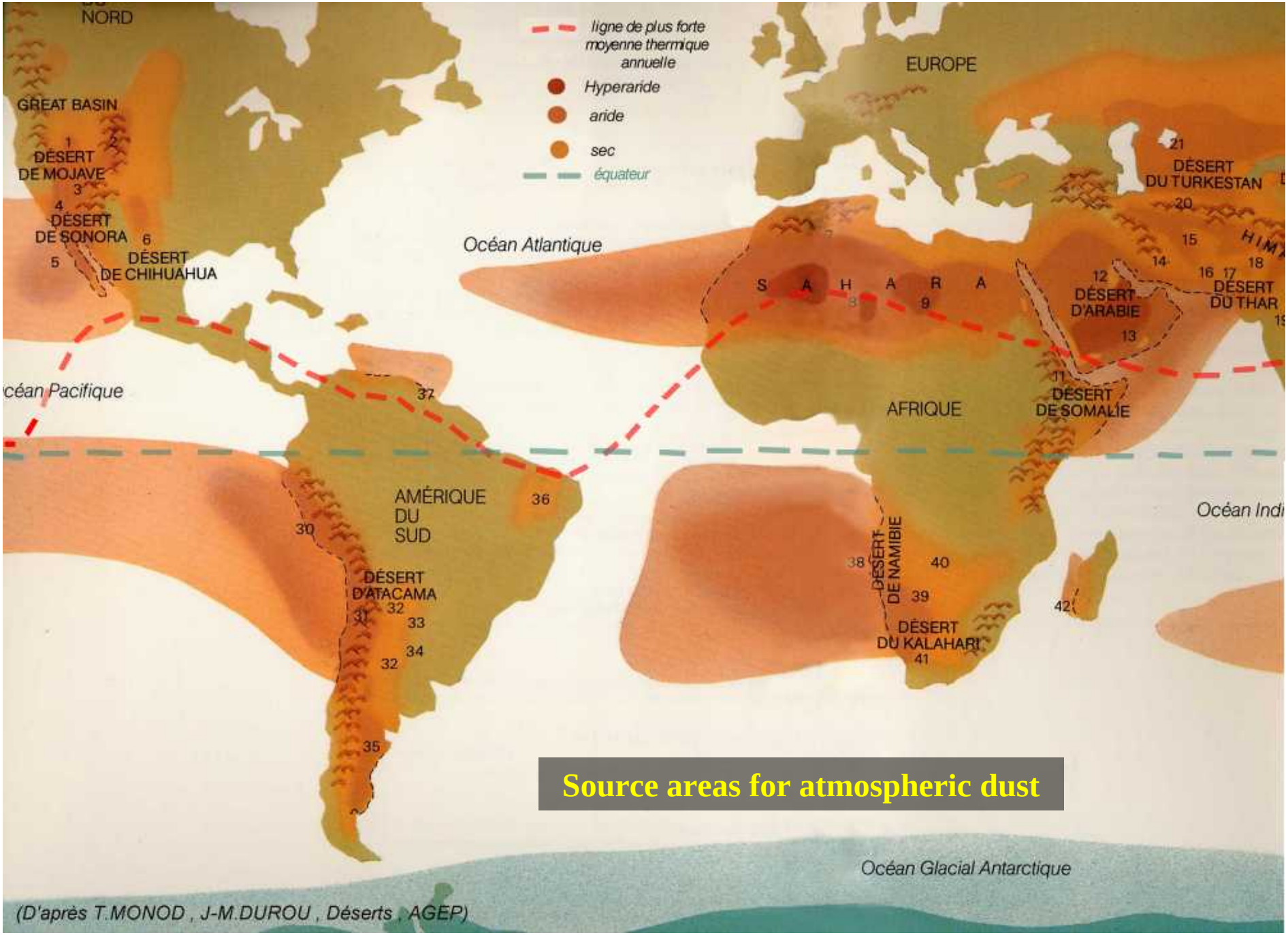


Mars, transverse dunes

Transport in suspension







Source areas for atmospheric dust

Dust storm, Longyearbyen, Svalbard

Dust storm and loess accumulation, Adventdalen, Svalbard

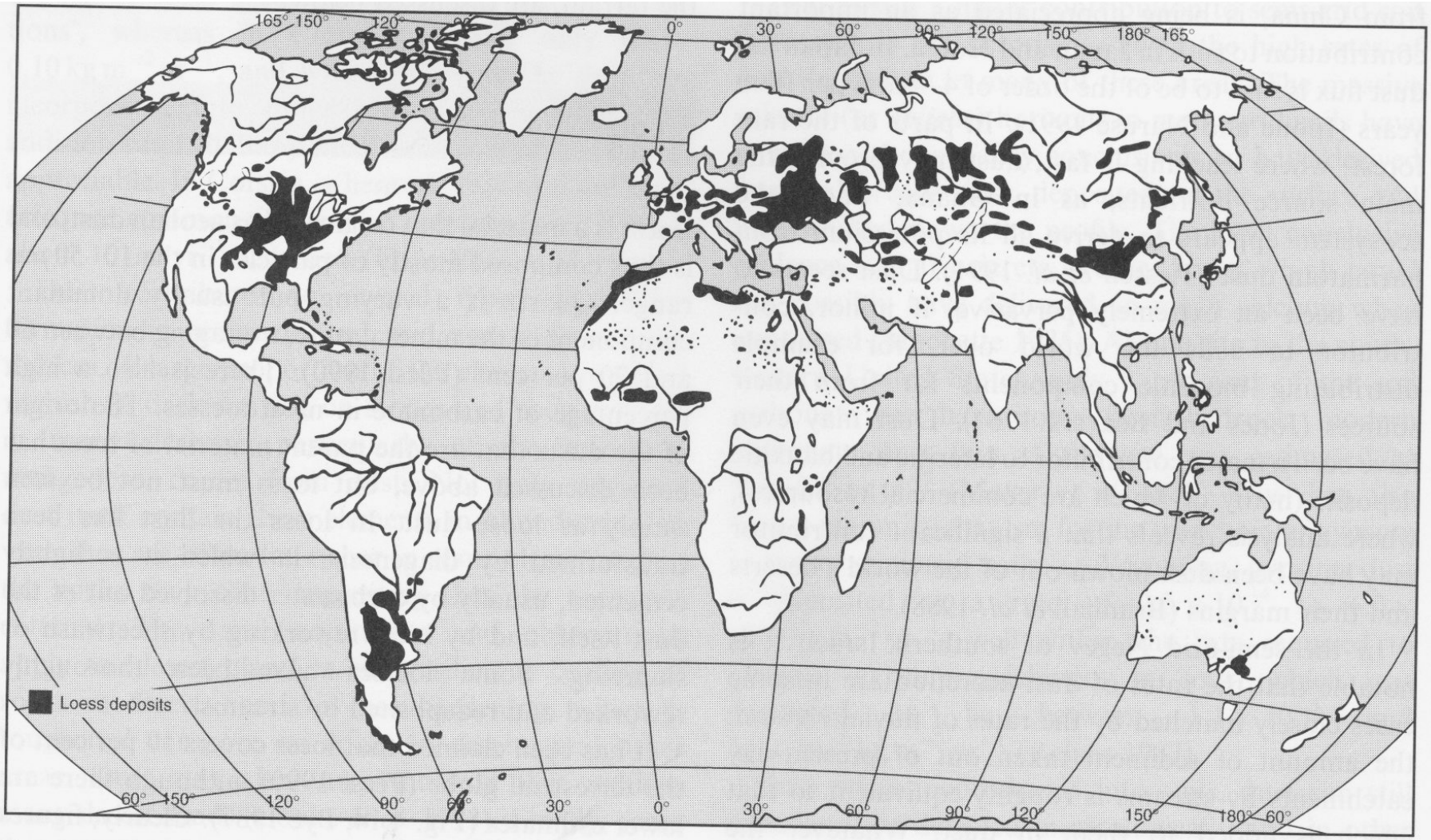
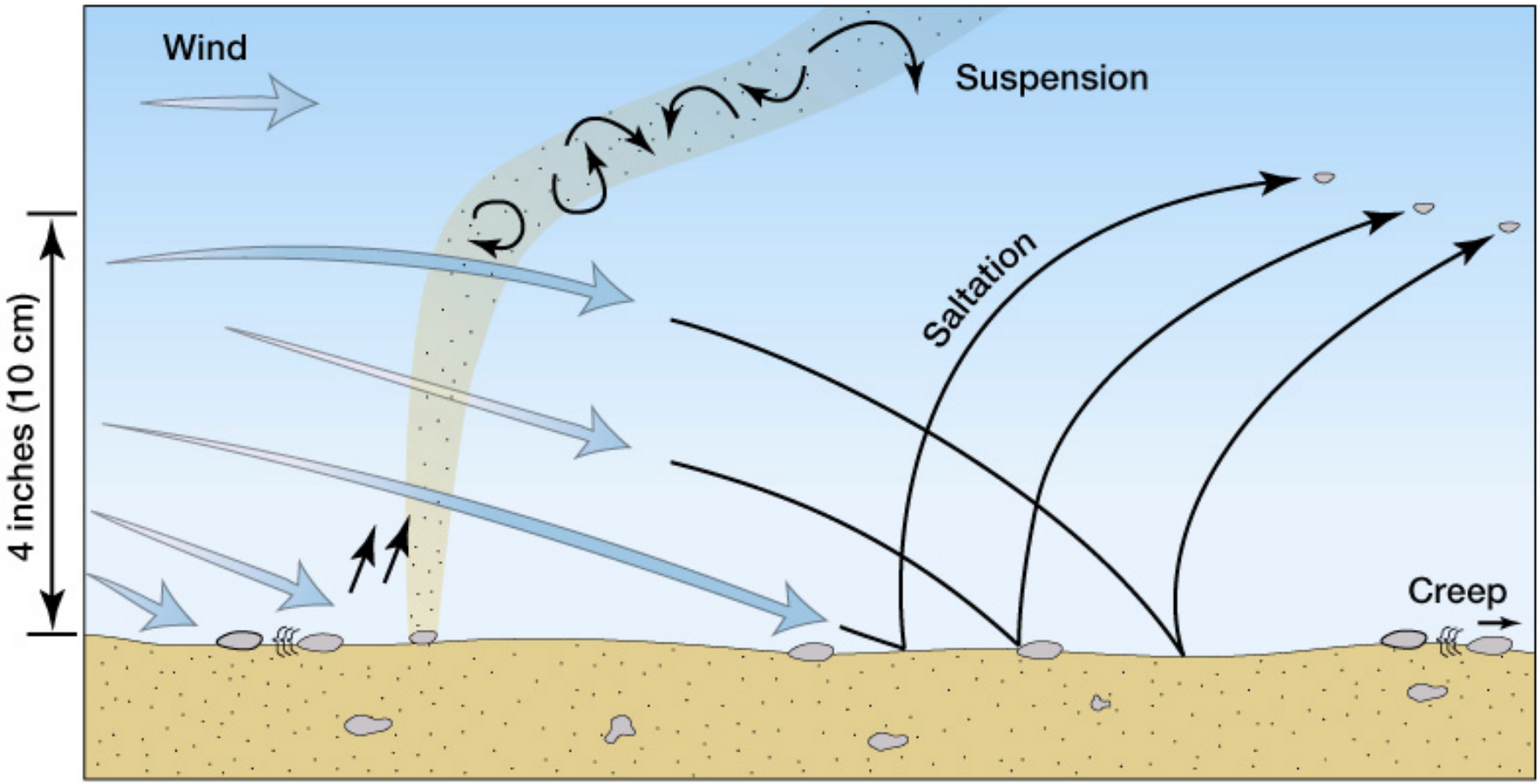
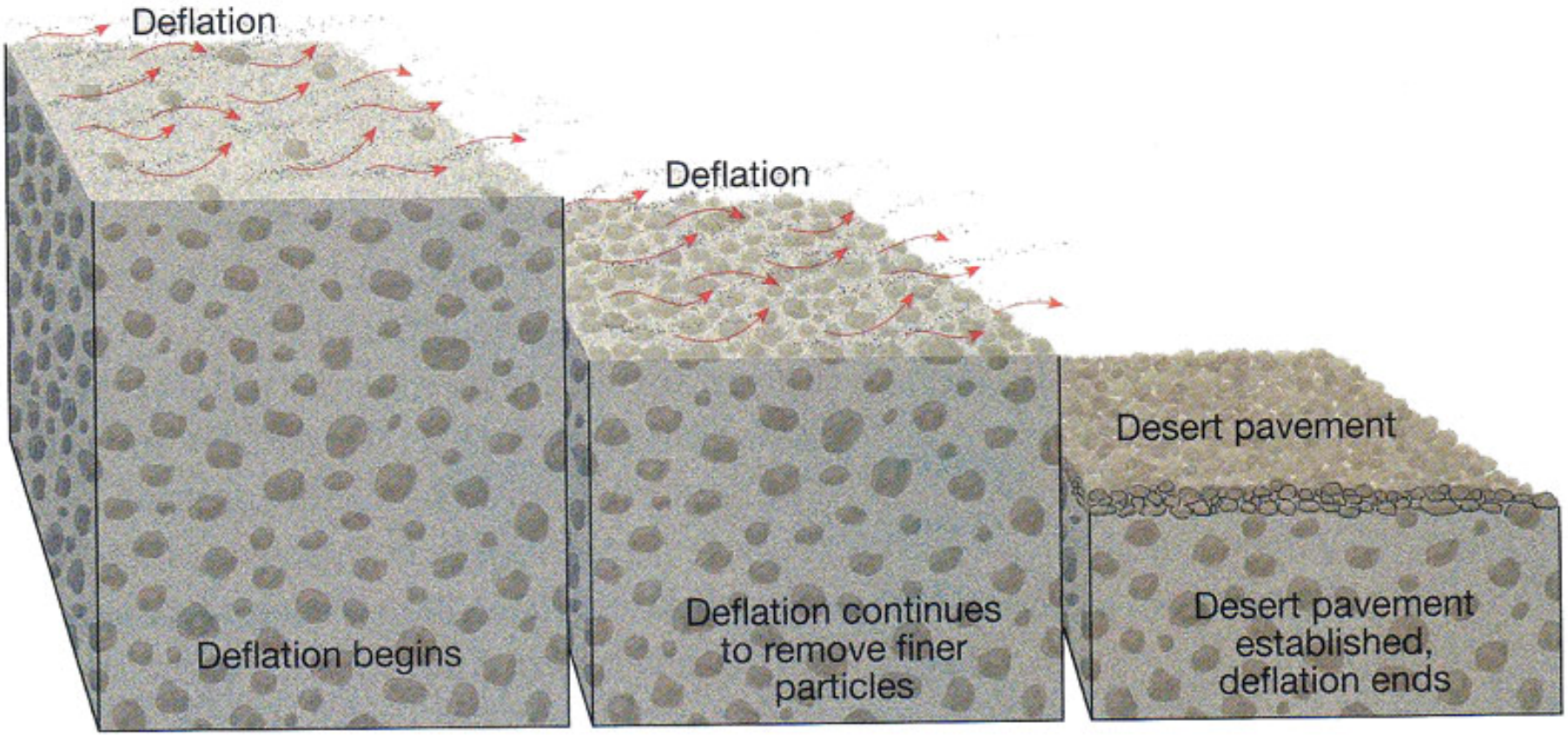


Fig. 4.14 Principal loess-covered areas in the world.

Major global loess accumulations

Transport in suspension removes fines from the surface





Formation of deflation surface

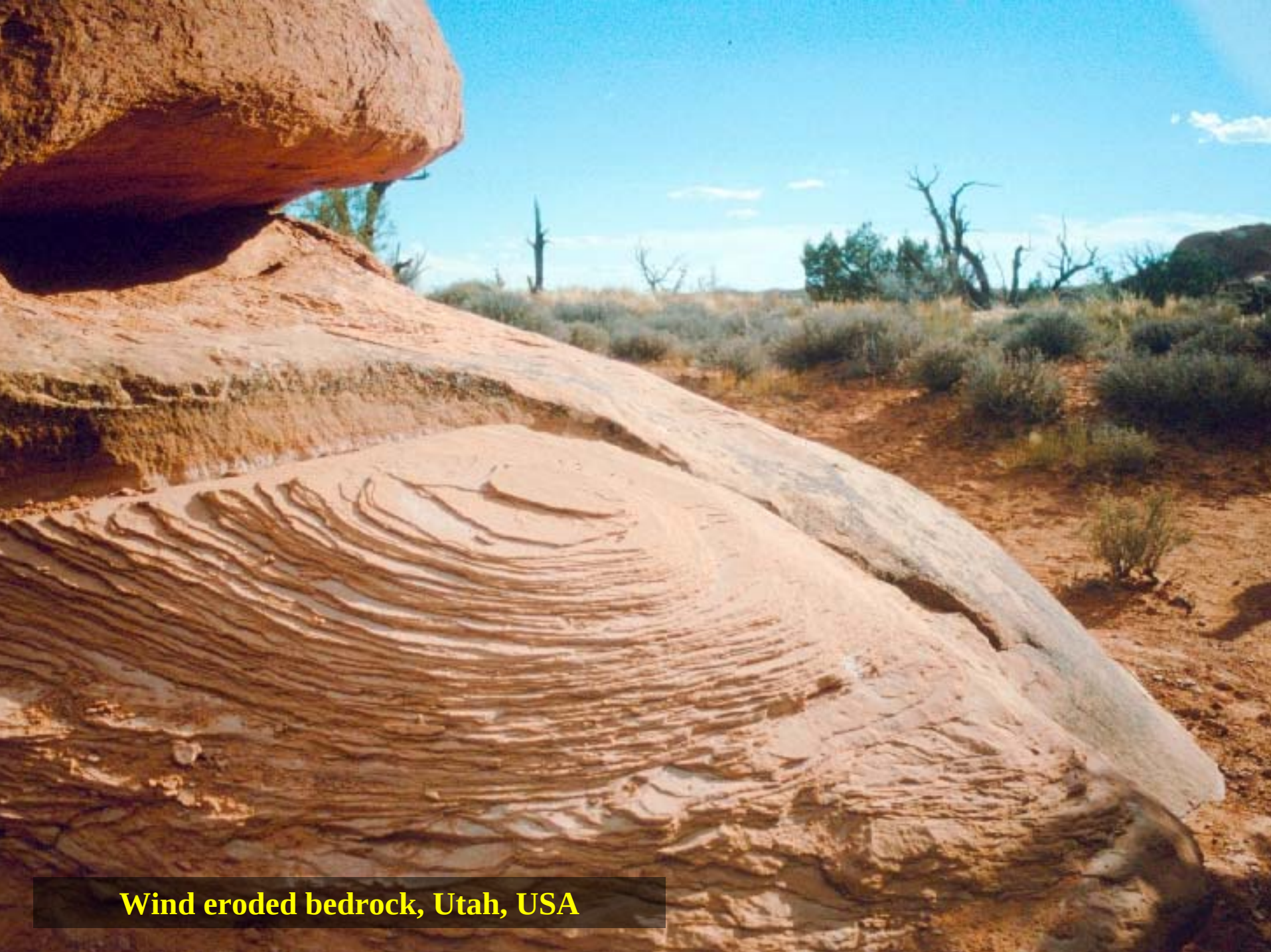
Desert pavement, Sahara

Desert pavement, Sahara

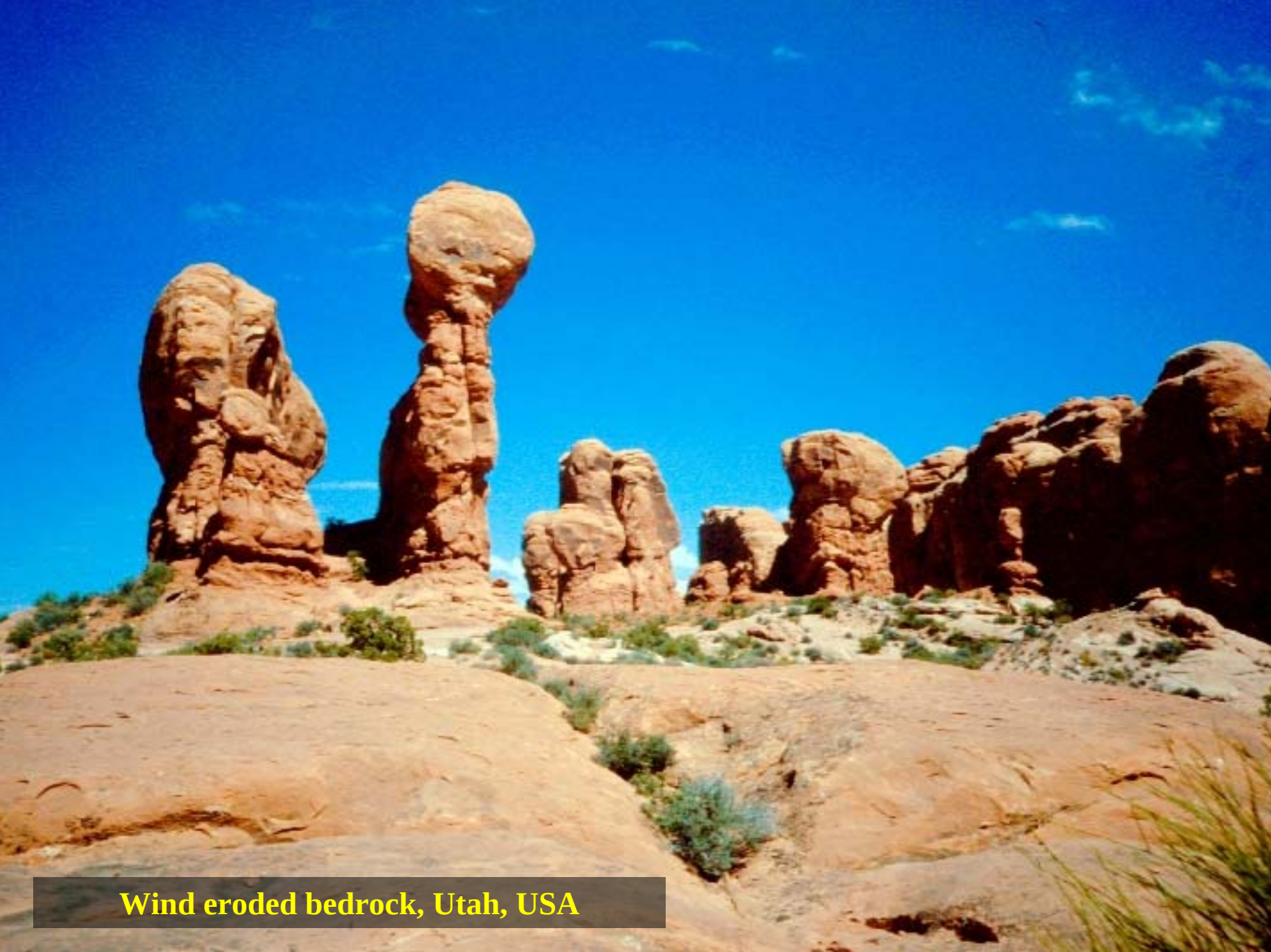
Desert (?) pavement, Svalbard


Desert varnish

Desert varnish



Wind eroded bedrock, Utah, USA



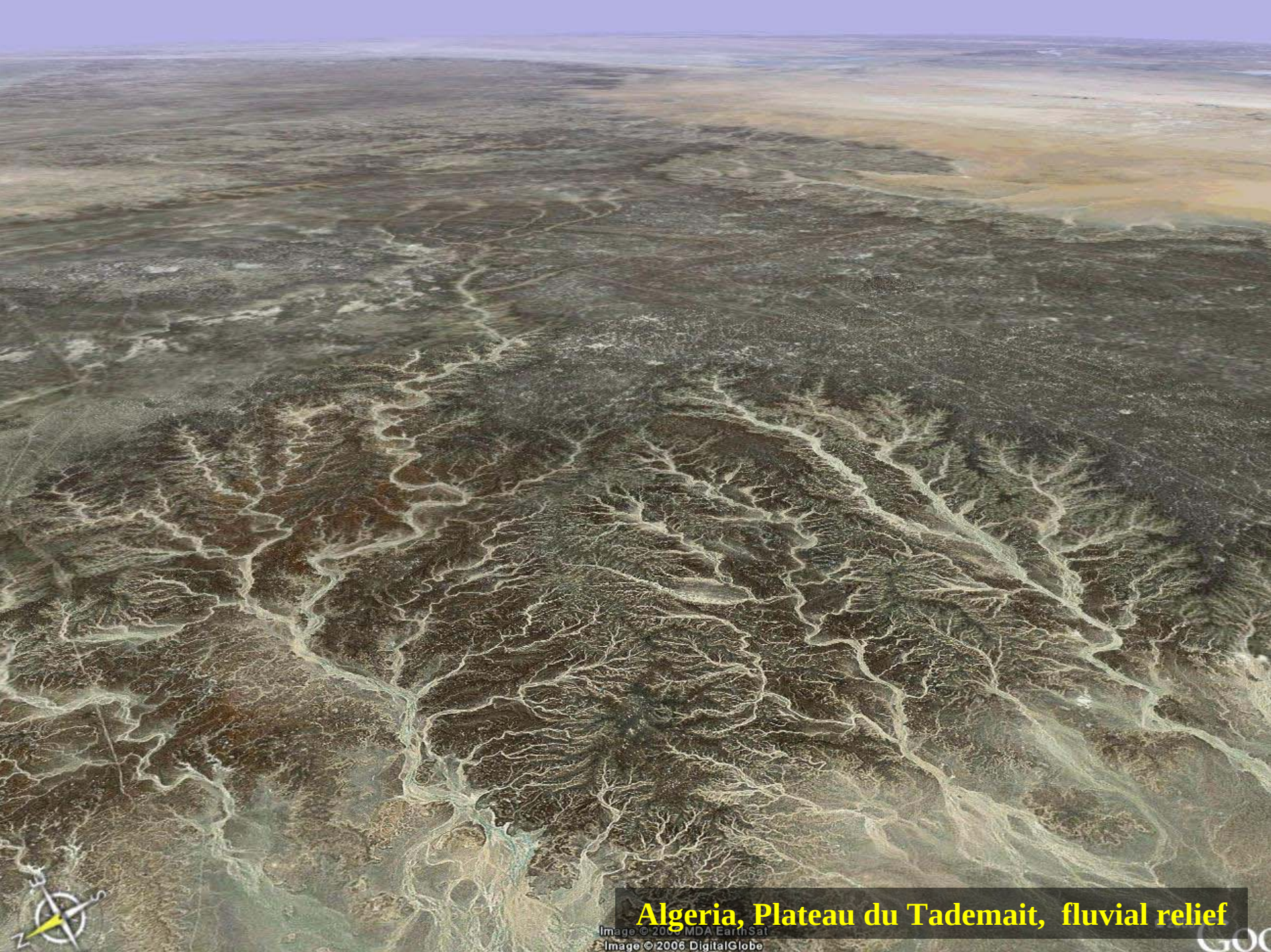
Wind eroded bedrock, Utah, USA

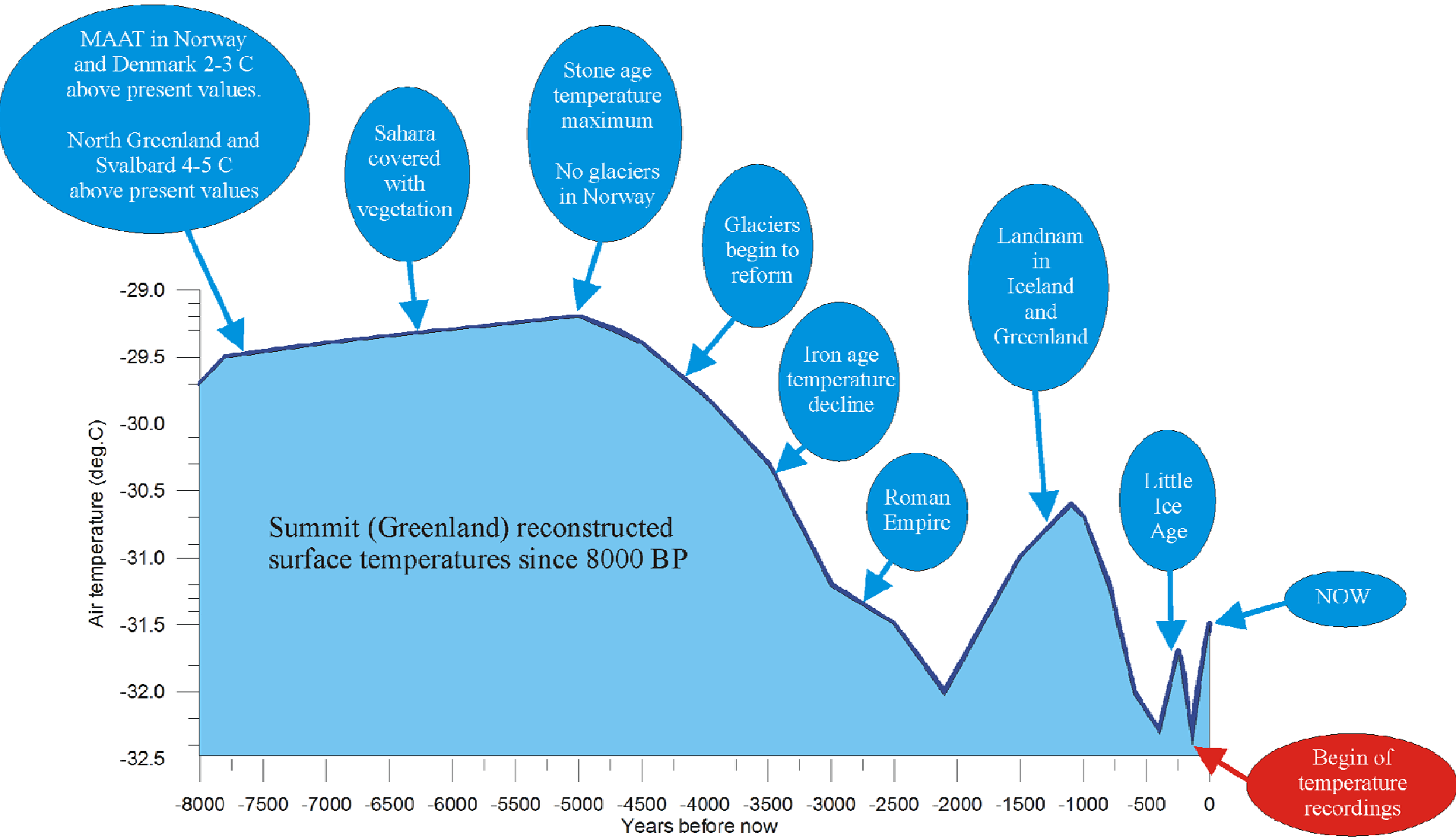

Delicate Arch, Utah, USA

Rivers in deserts: Sungava Wadi, Sudan


Wadi, Yemen


Wadi, Yemen


Algeria, Plateau du Tademait, fluvial relief
Image © 2006 DigitalGlobe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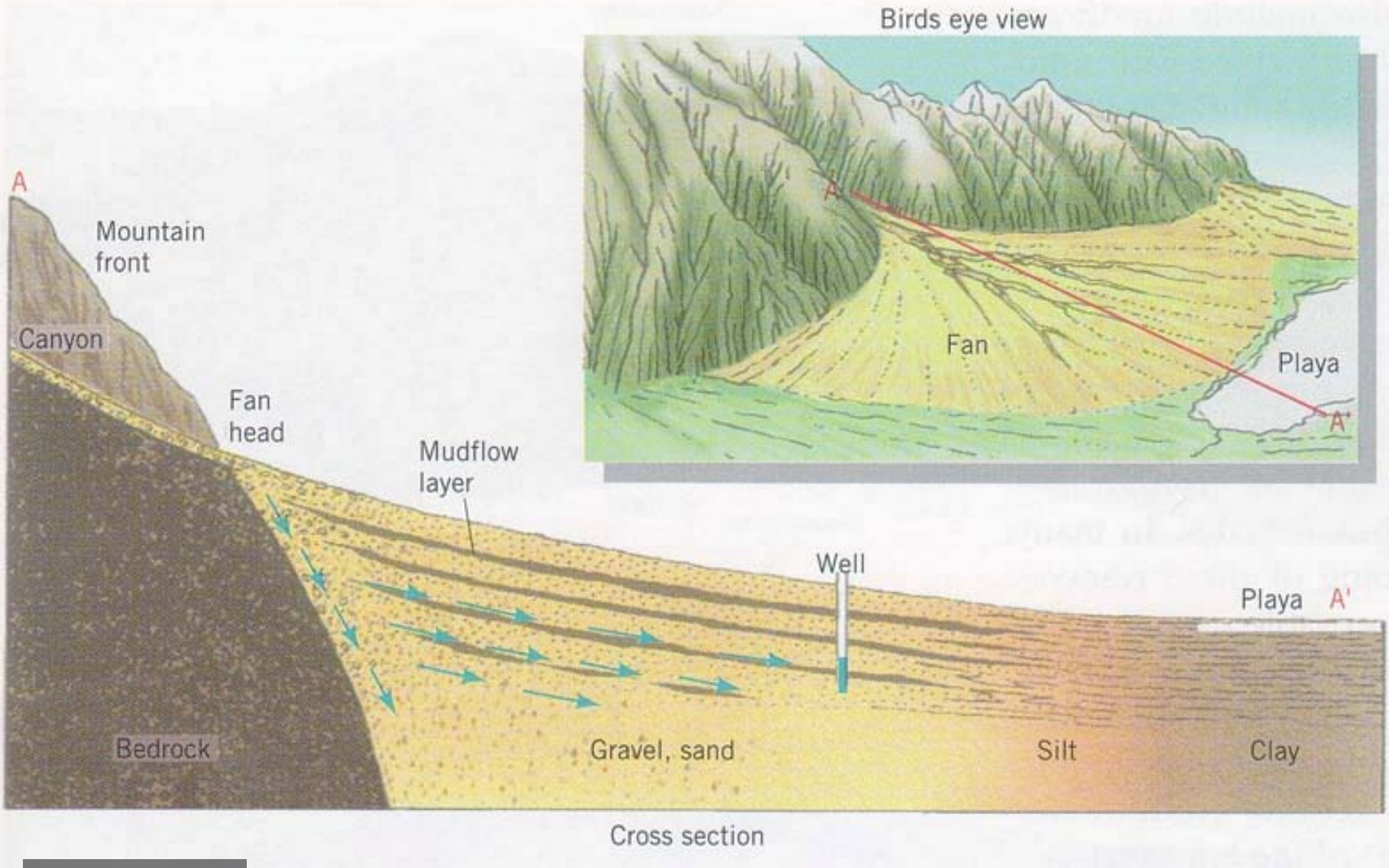
Years before now


Birds eye view
A
A'
Fan
Playa
A
Mountain front
Canyon
Fan head
Mudflow layer
Well
Playa
A'
Bedrock
Gravel, sand
Silt
Clay
Cross section

Playa


Playa, New Mexico
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Dessication cracks in Playa, New Mexico

Ephemerald lakes in Atacamo desert, Chile

Salt pan in deflation area, Death Valley, USA

Oasis, Tunesia

Plantation in Gabes Oasis, Tunesia

Irrigation, Libia

The great ”Dust Bowl”

Wall of dust approaching town in Kansas, USA, 1935

Soil erosion 19 March 1996 in Meade County, Kansas, USA

Soir erosion, Kansas, USA

Soir erosion, Kansas, USA