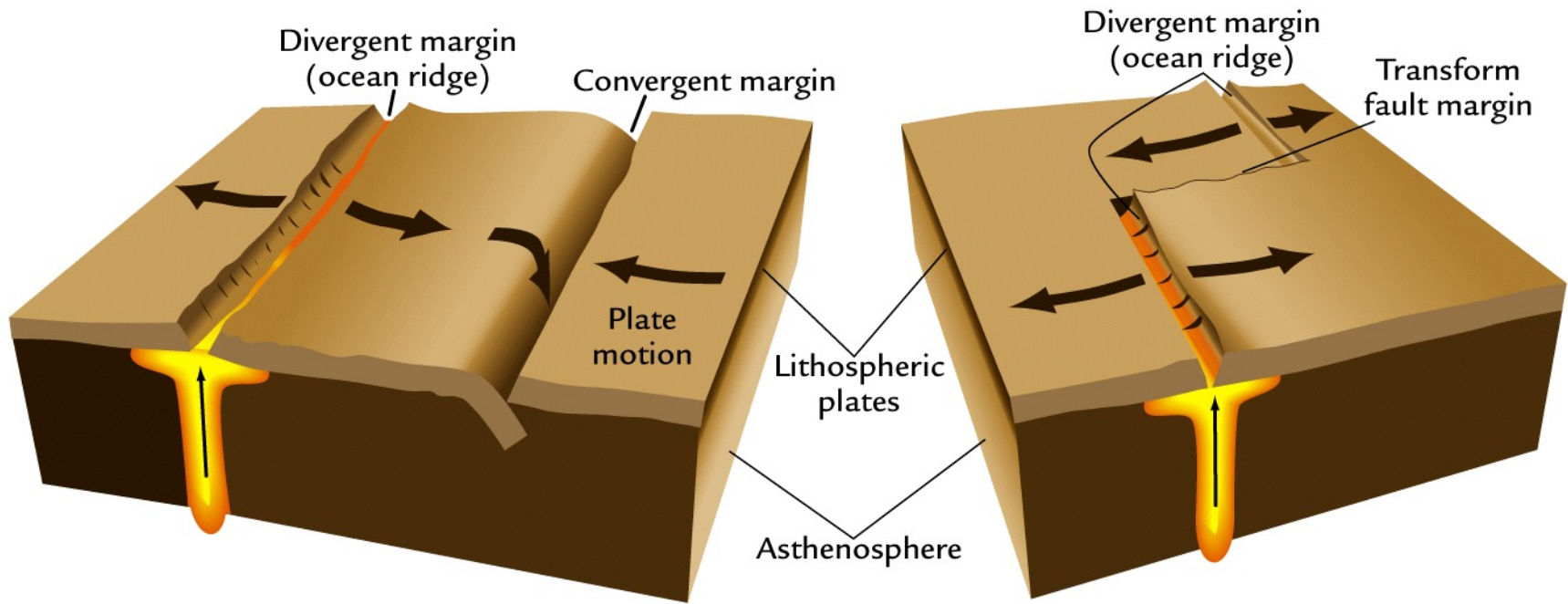
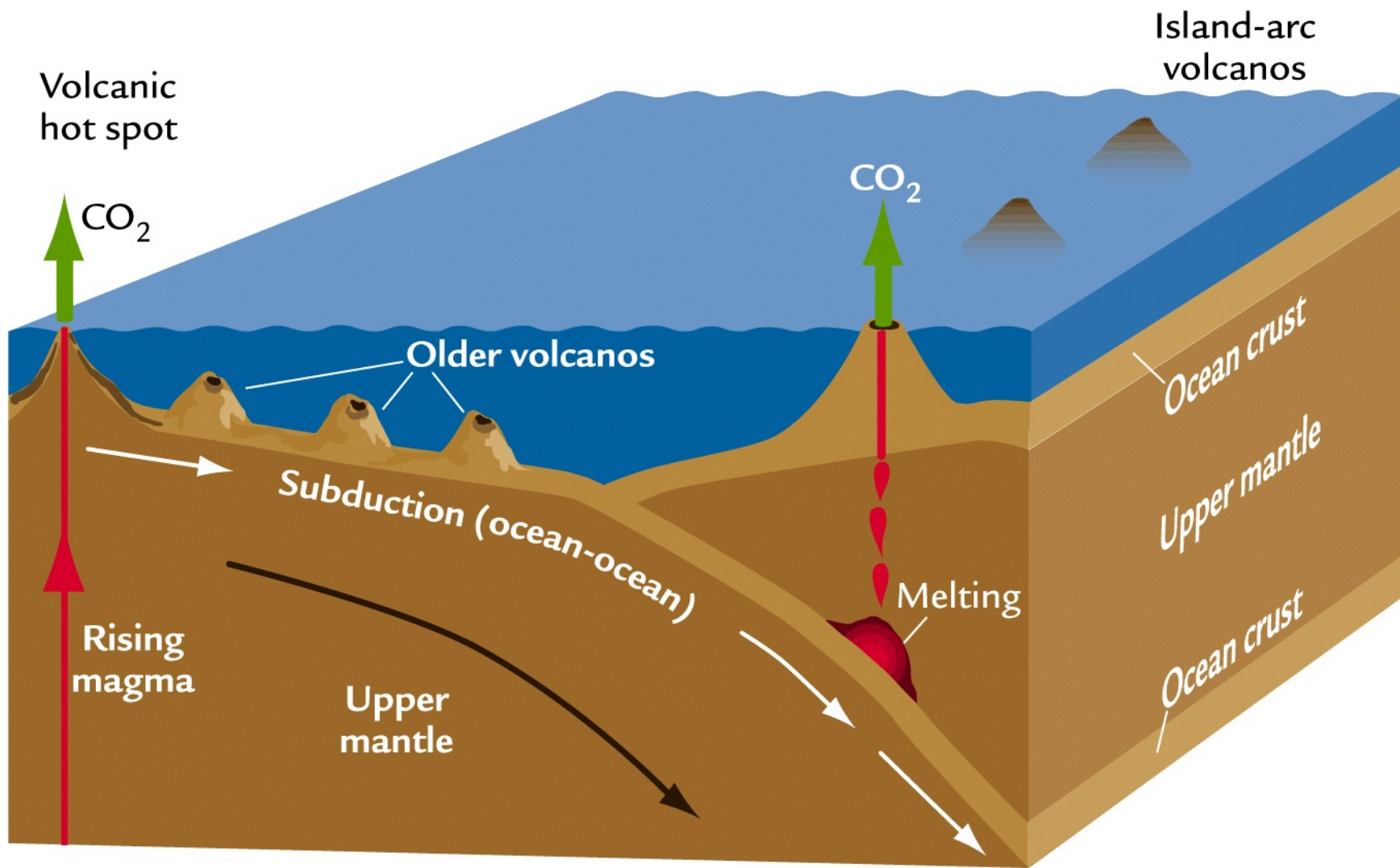


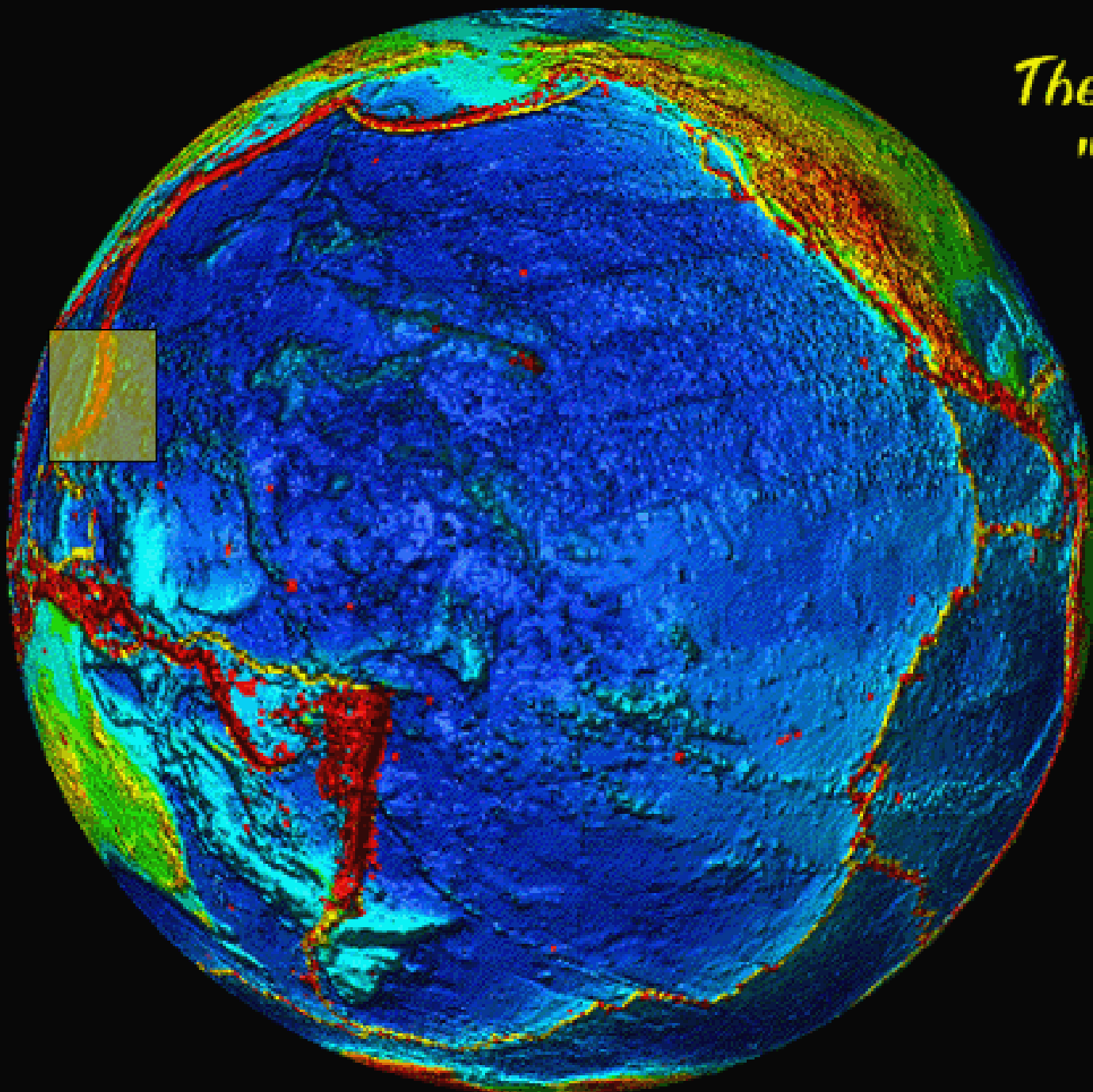
A dramatic scene of a volcanic eruption. In the foreground, a dark, conical volcano rises against a pale, hazy sky. A massive, bright orange-red plume of lava and ash billows upwards from the crater, forming a large, textured column that dominates the center of the image. The lava flow appears to be cascading down the inner slopes of the volcano. The overall atmosphere is one of intense heat and power.

Volcanoes

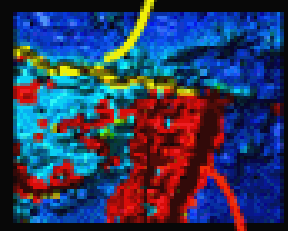




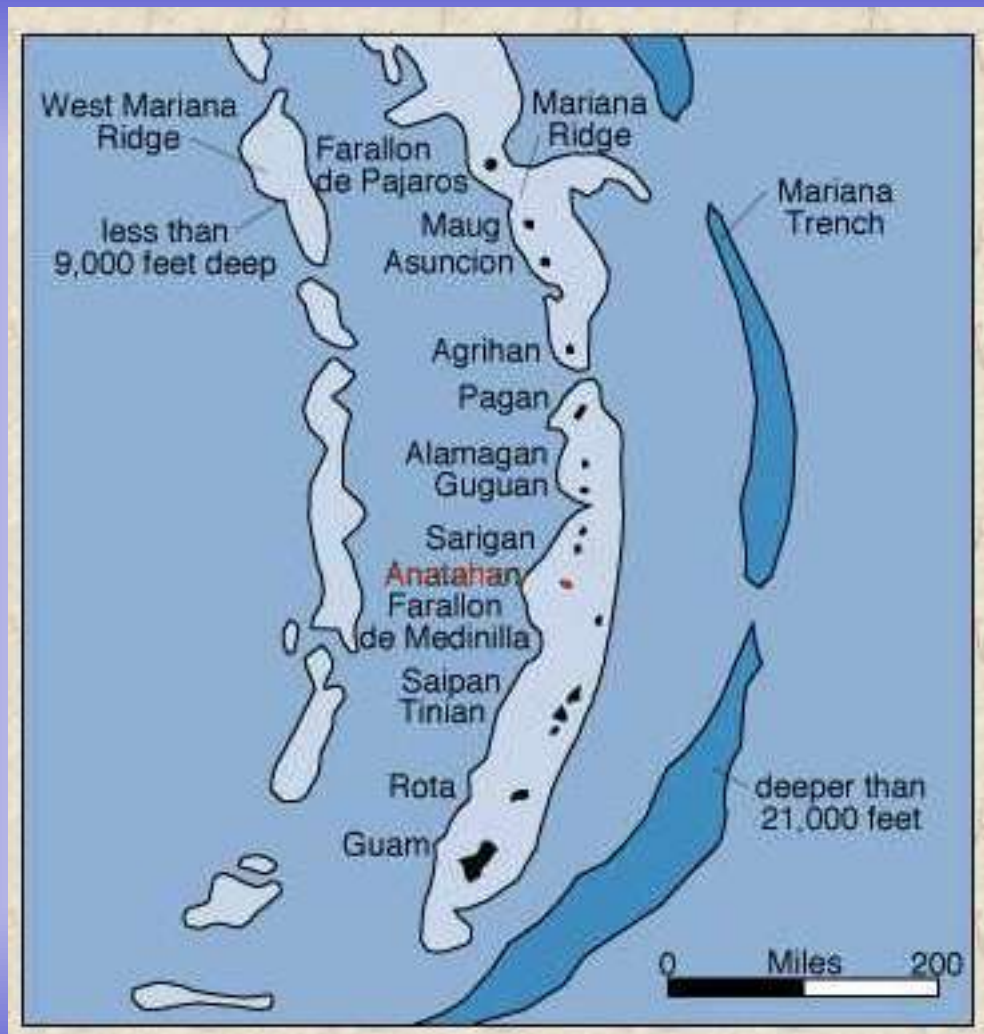
The Pacific "Ring of Fire"



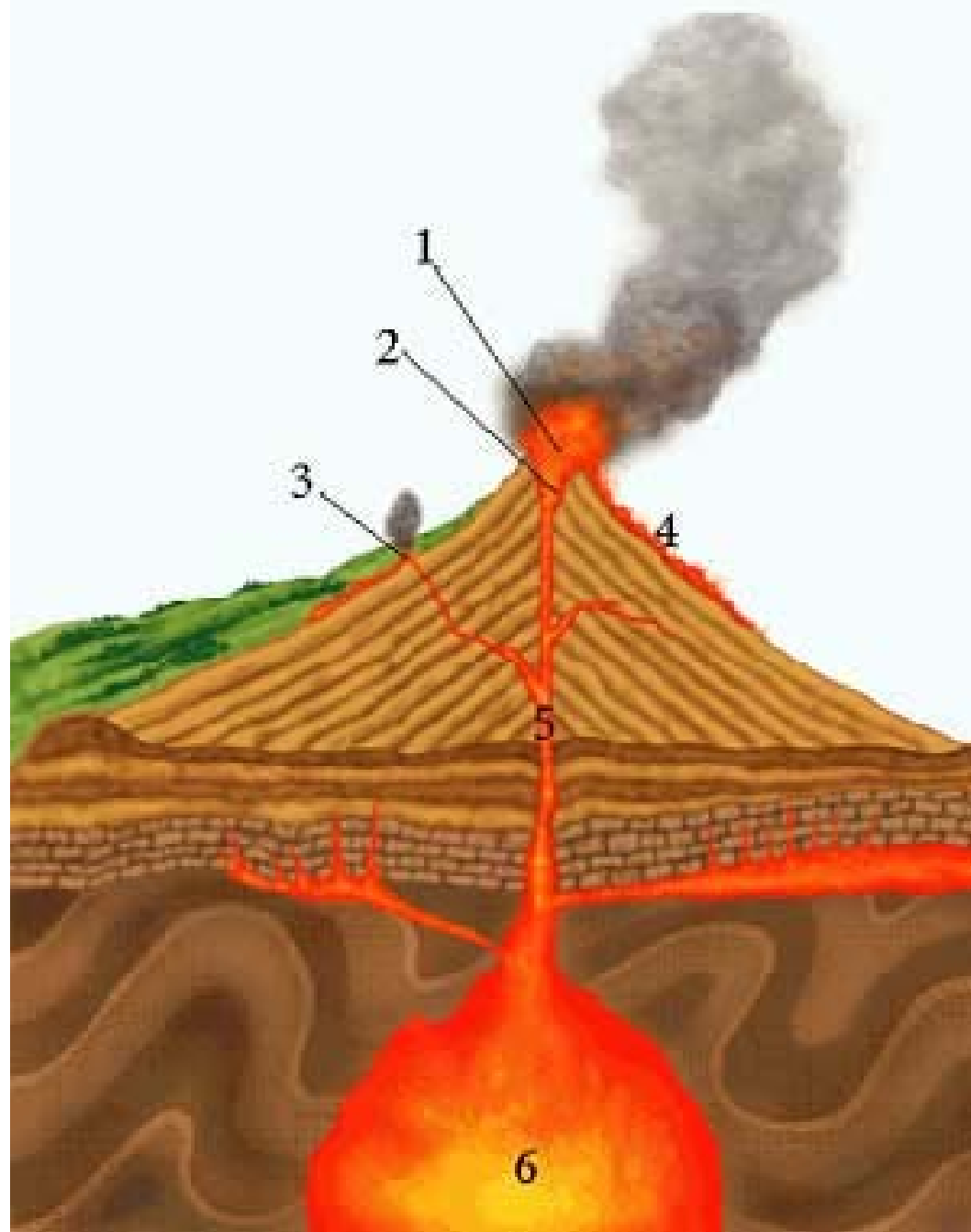
Crustal Plate
Boundary

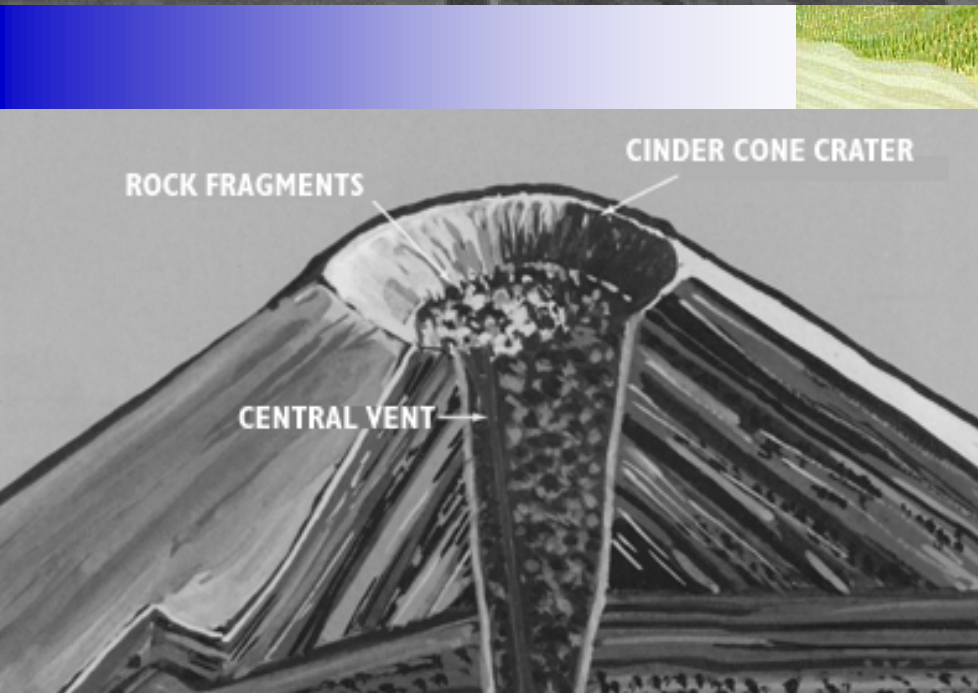
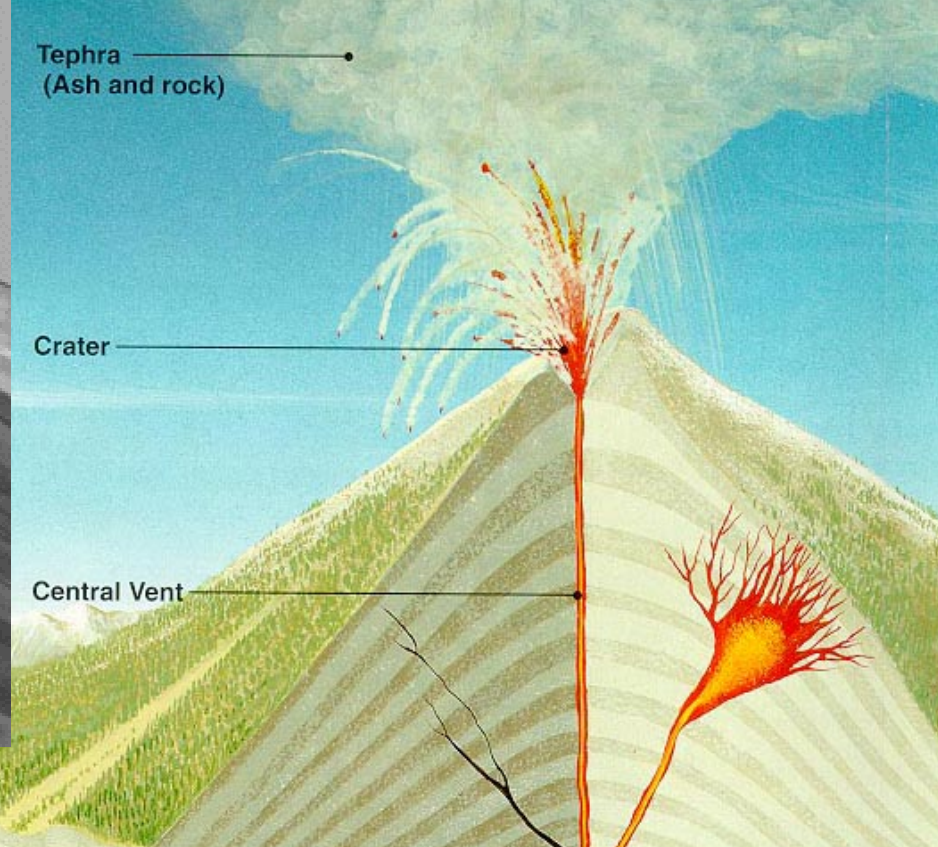
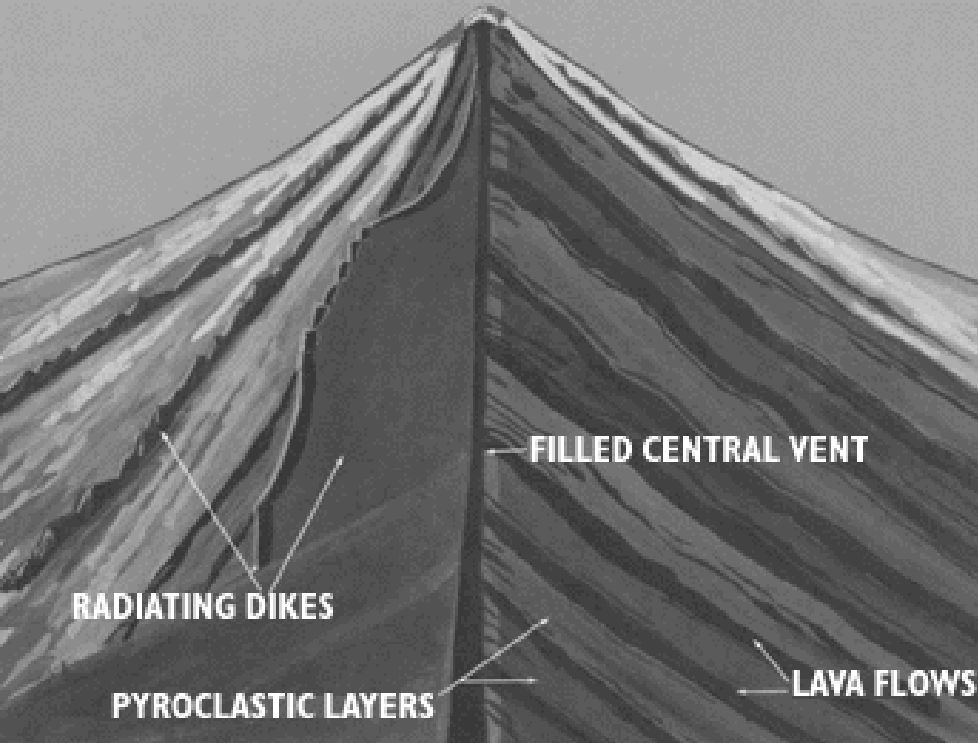


Epicenters of
Earthquakes,
Magnitude ≥ 5
since 1980



Volcanic Eruption







Mt St Helens, USA

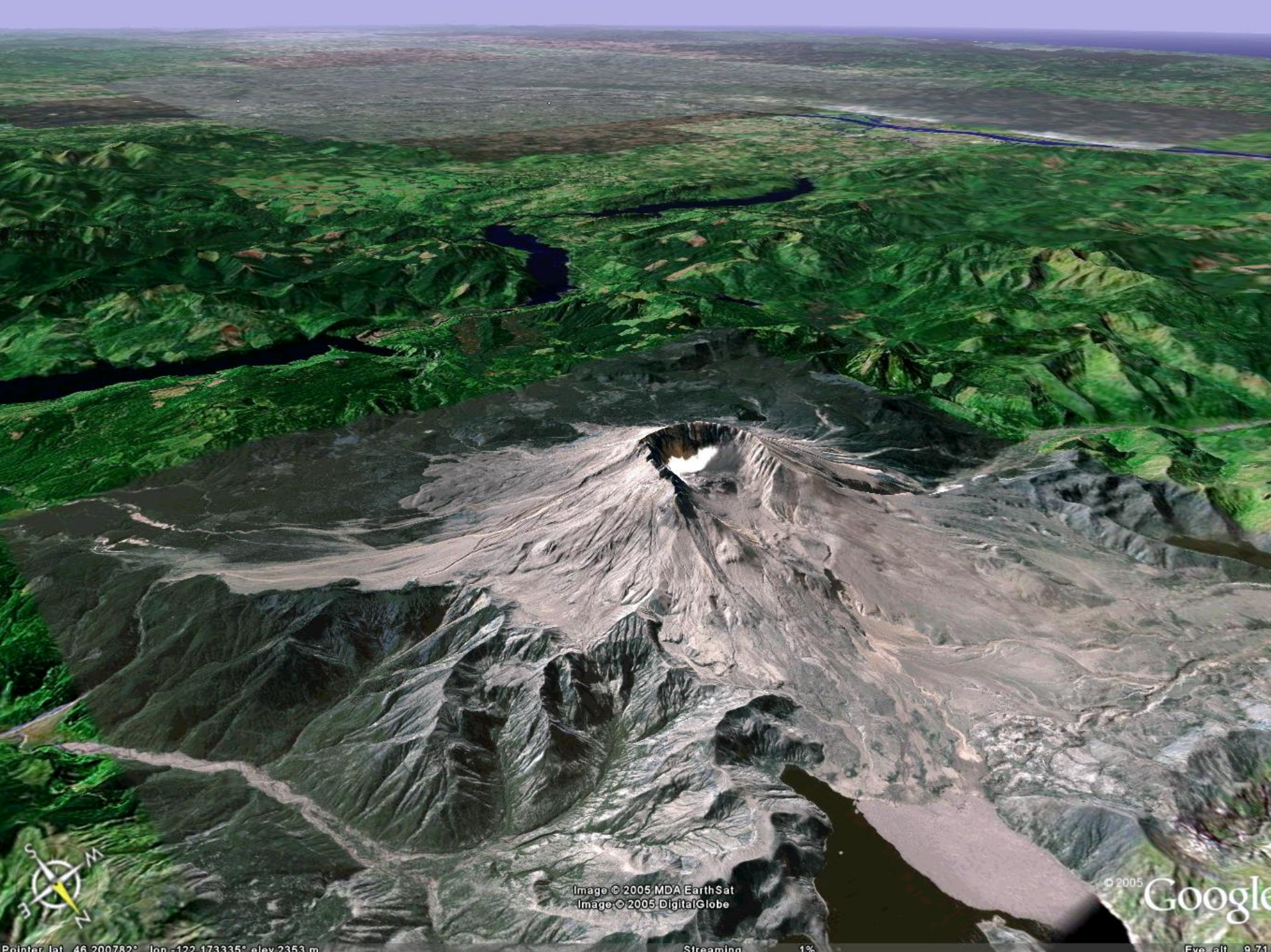


Image © 2005 MDA EarthSat
Image © 2005 DigitalGlobe

© 2005

Google

Pointer lat: 46.200782° lon: -122.173335° elev: 2353 m

Streaming 1%

Elev. alt: 9.7



Image © 2005 MDA EarthSat
Image © 2005 DigitalGlobe

Mt Ranier, USA © 2005

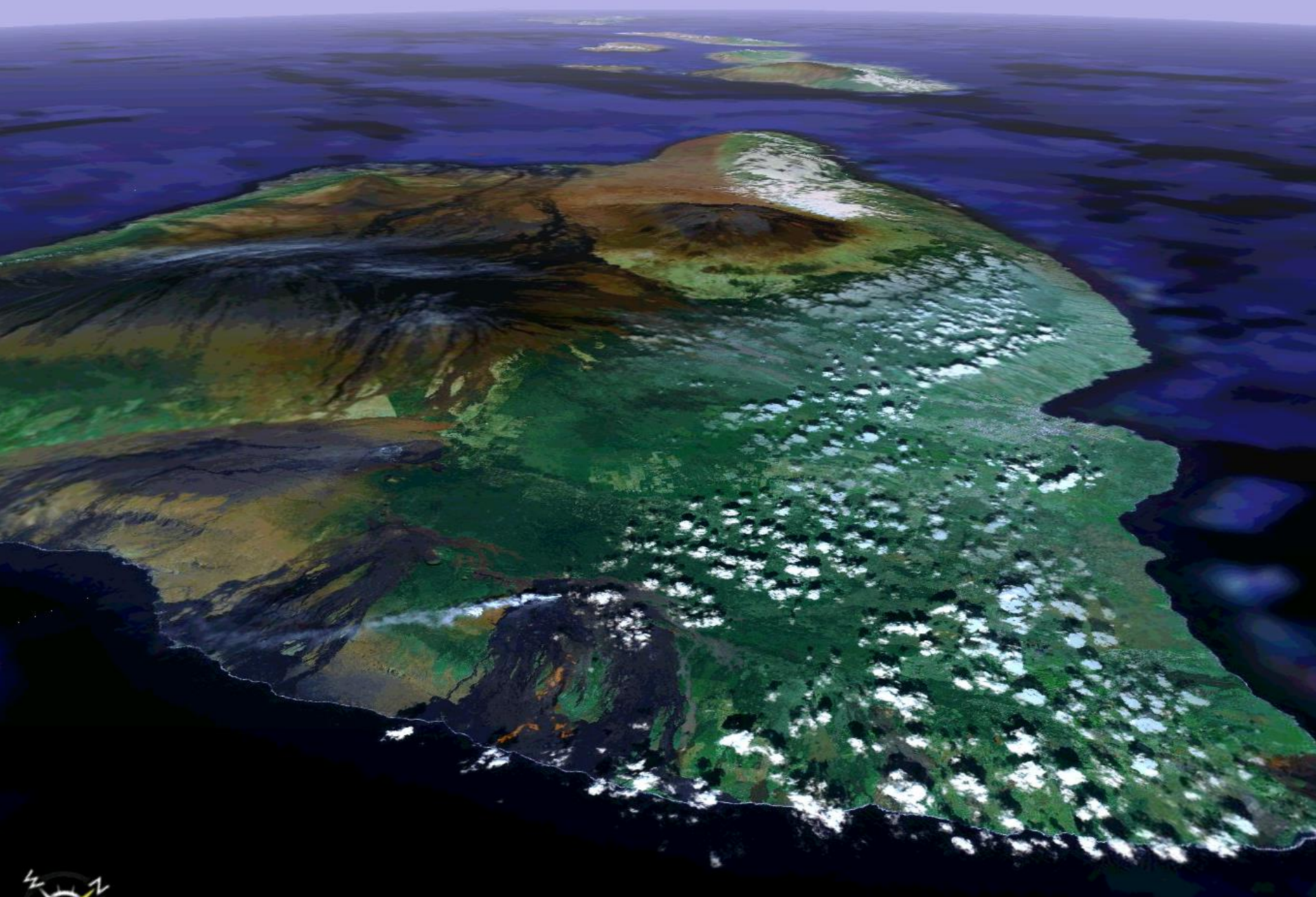
Google



Galapagos Islands



Galapagos Islands



Hawaii, USA

Image © 2005 DigitalGlobe
Image © 2005 MDA EarthSat

© 2005 Google



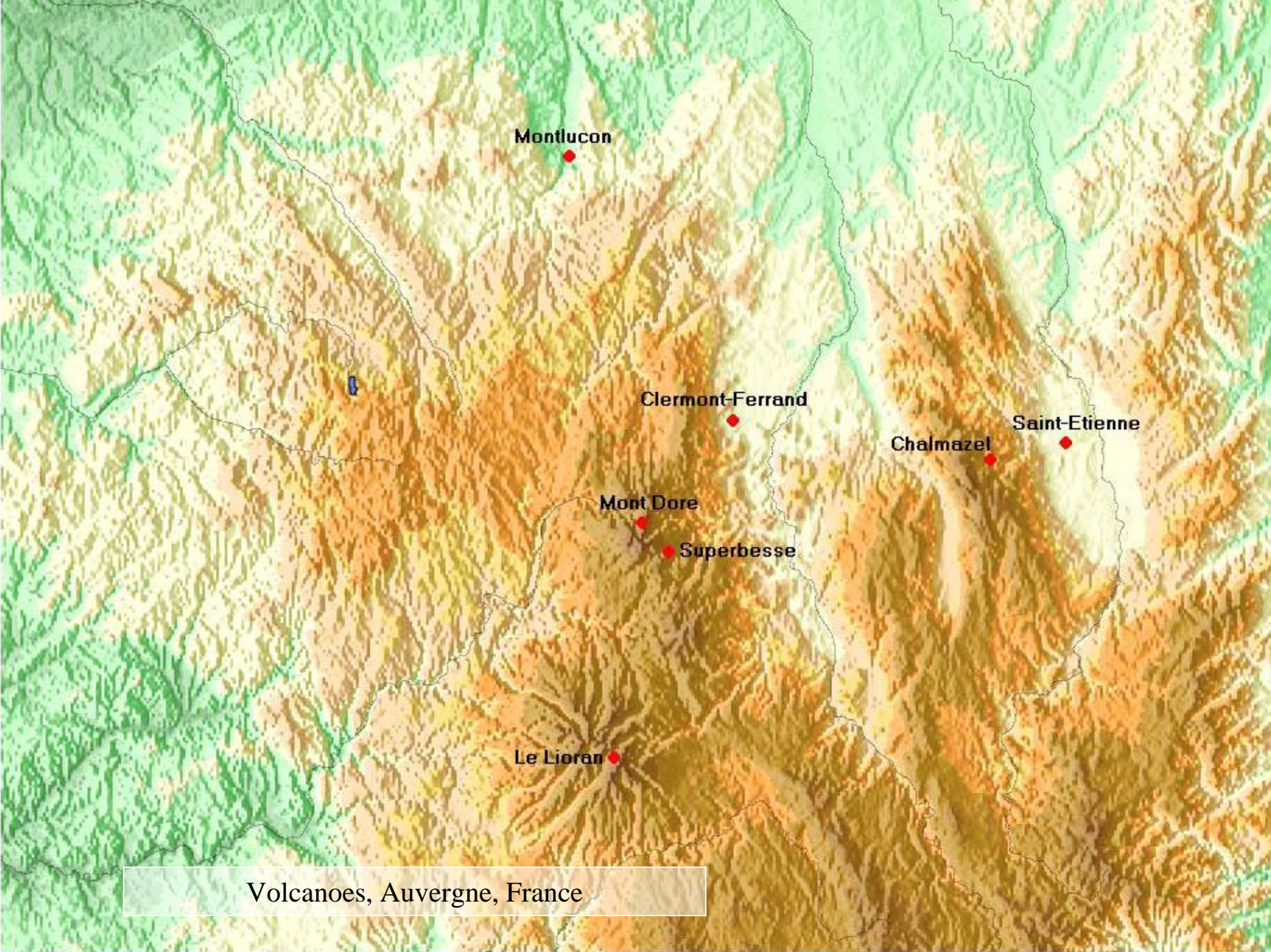
Cinder Cone, Mauna Kea Volcano Hawaii



Stratovolcano Mount Mageik, Alaska



Stratovolcano Oræfajökull, Iceland



Montlucon

Clermont-Ferrand

Saint-Etienne

Chalmazel

Mont Dore

Superbesse

Le Lioran

Volcanoes, Auvergne, France

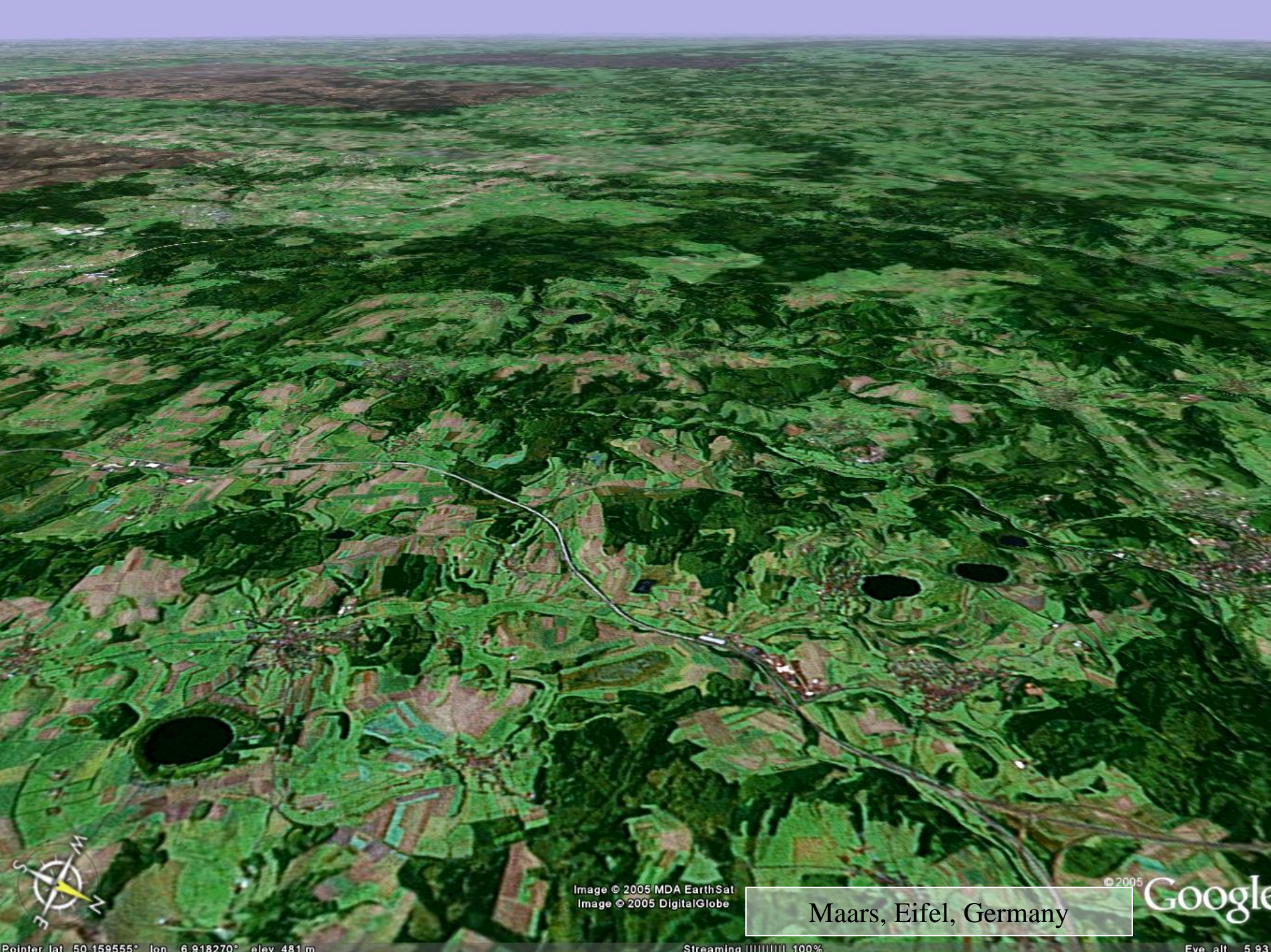


Image © 2005 MDA EarthSat
Image © 2005 DigitalGlobe

Maars, Eifel, Germany

© 2005 Google

Pointer lat 50.159555° lon 6.918270° elev 481 m

Streaming 100%

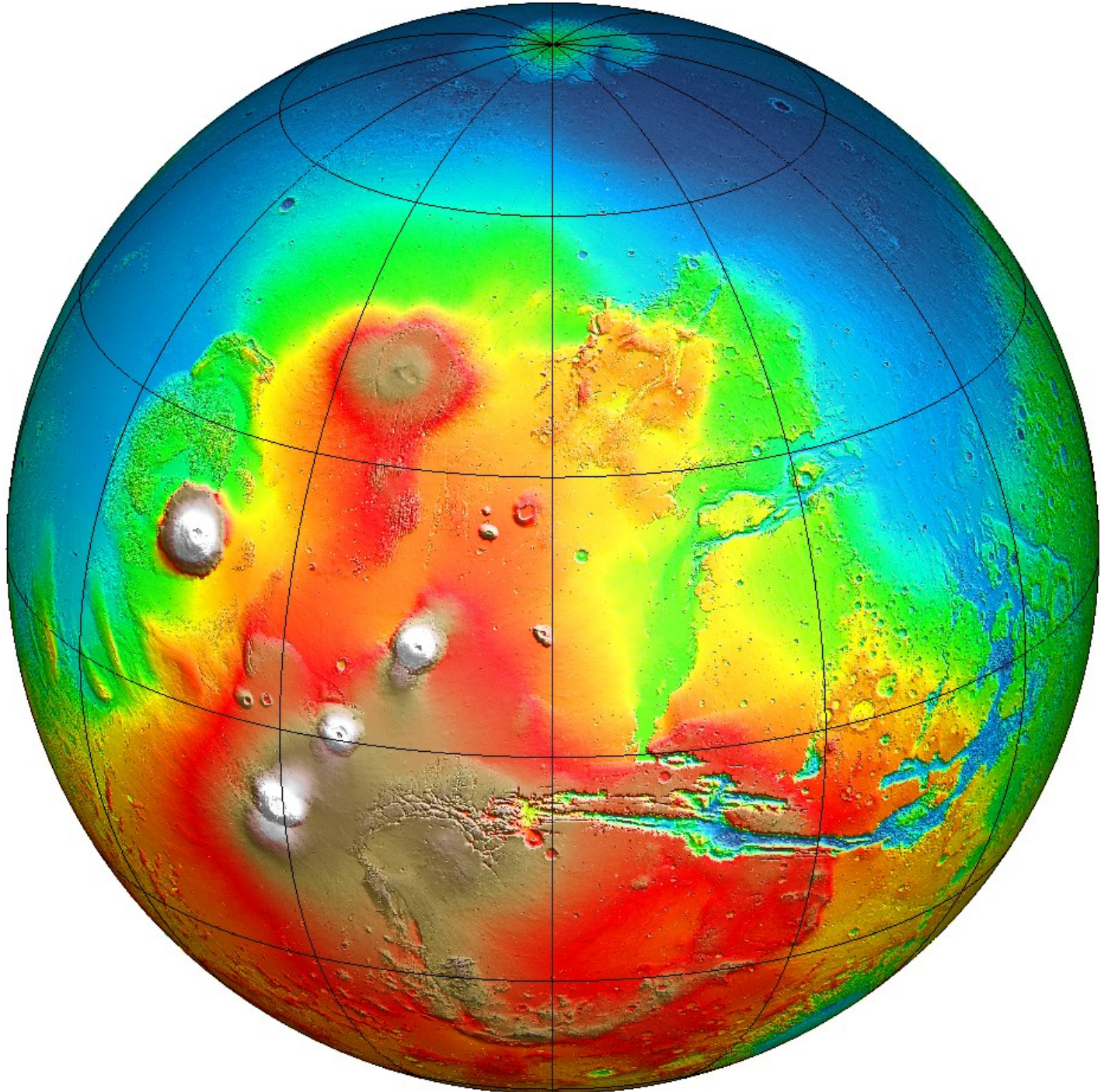
Elev alt 5.99



Maars, Eifel, Germany



The largest known volcano in the solar system, Olympus Mons, Mars





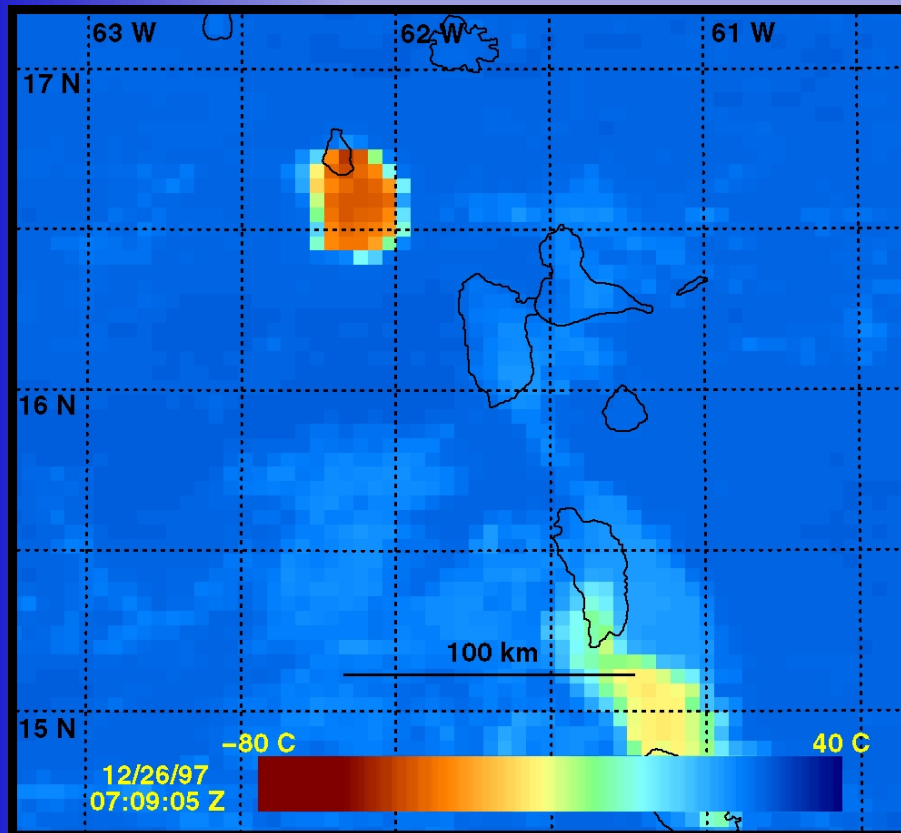
Volcanic ash; Klyuchevskoi eruption plume 1994



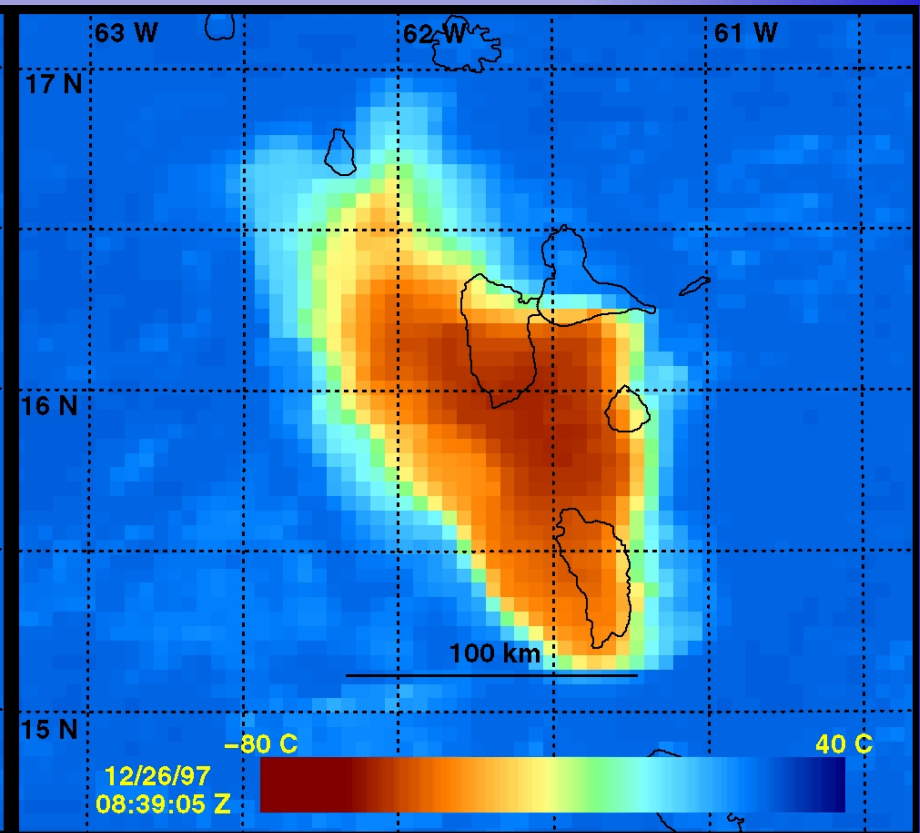
Volcanic ash; Klyuchevskoi eruption plume 1994



Mt Etna Sicily Eruption seen from satellite November 2002



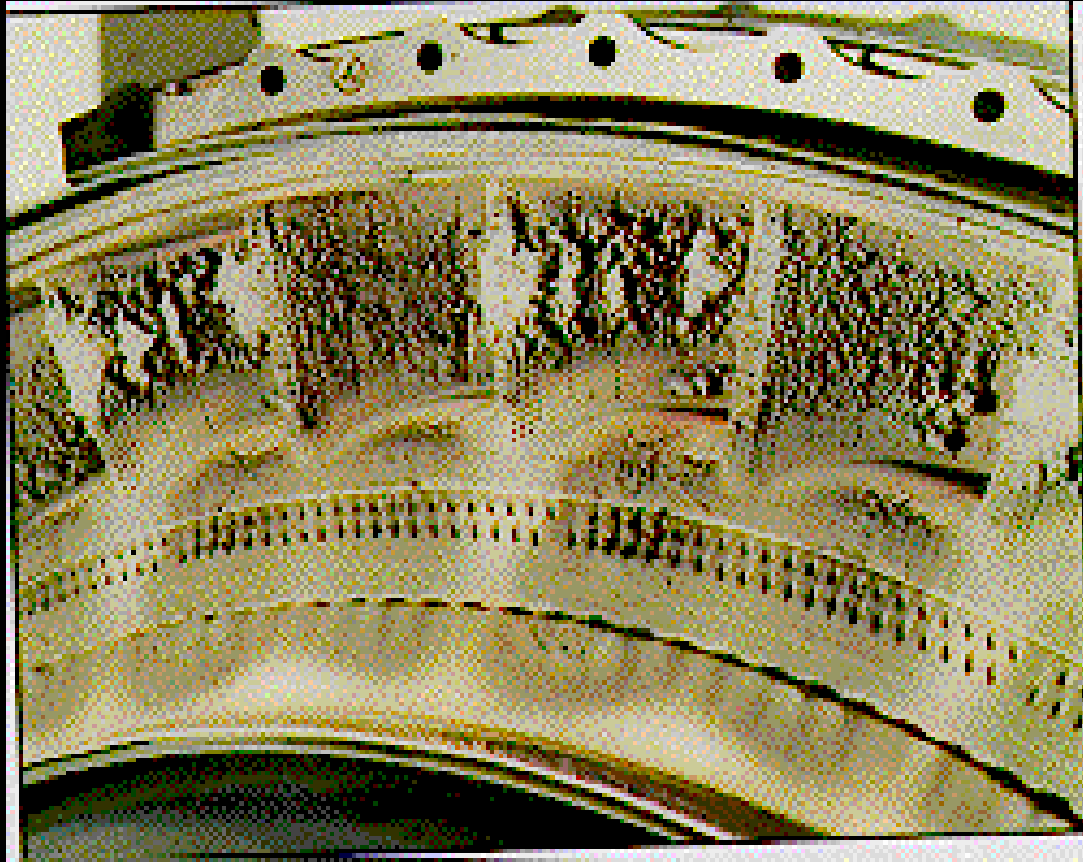
Volcanic Cloud Soufriere Hills
Volcano Montserrat 1997 0709hr



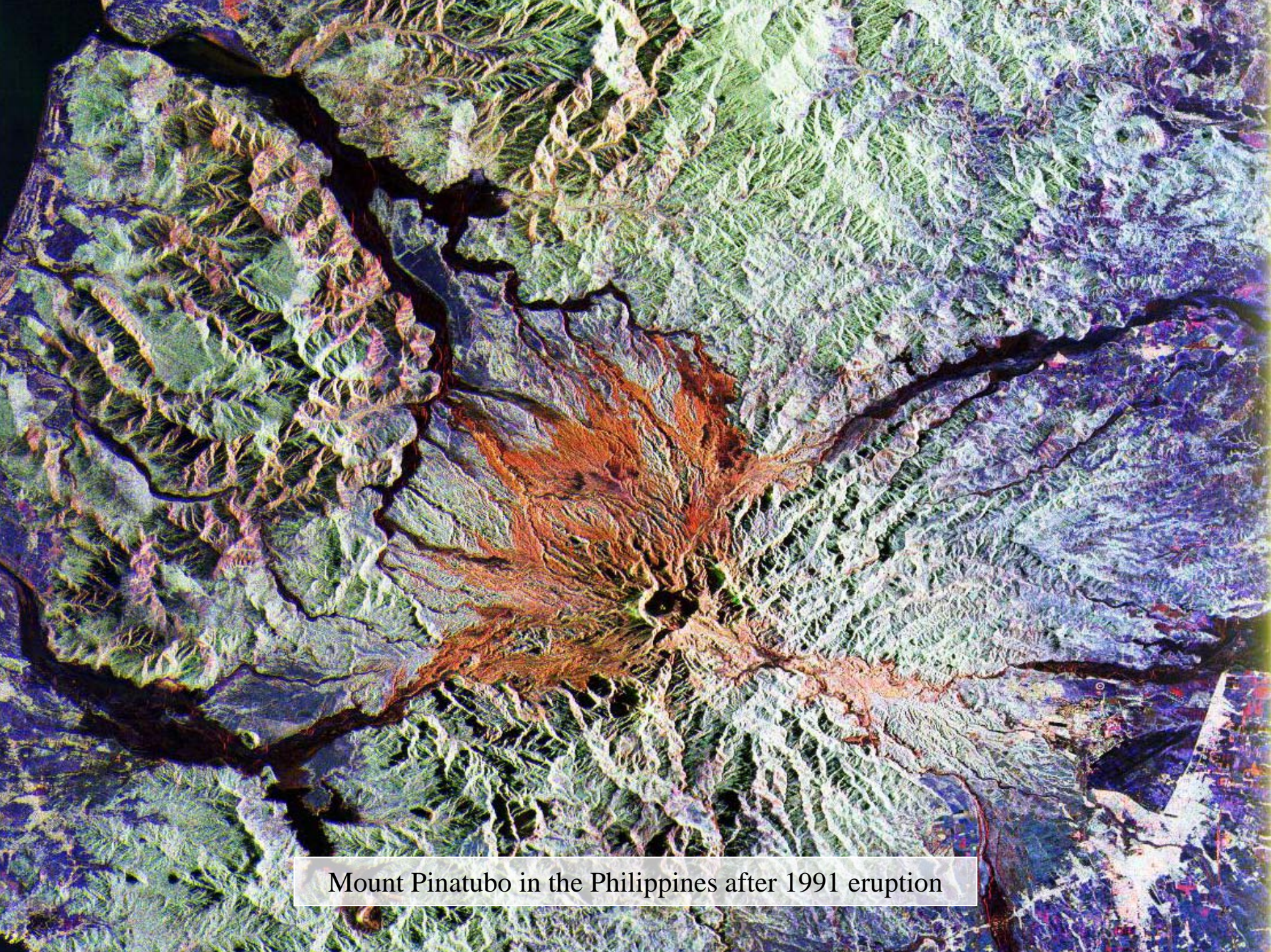
Volcanic Cloud Soufriere Hills
Volcano Montserrat 1997 0839hr







Volcanic ash in high-pressure nozzle guide vane B747 1982

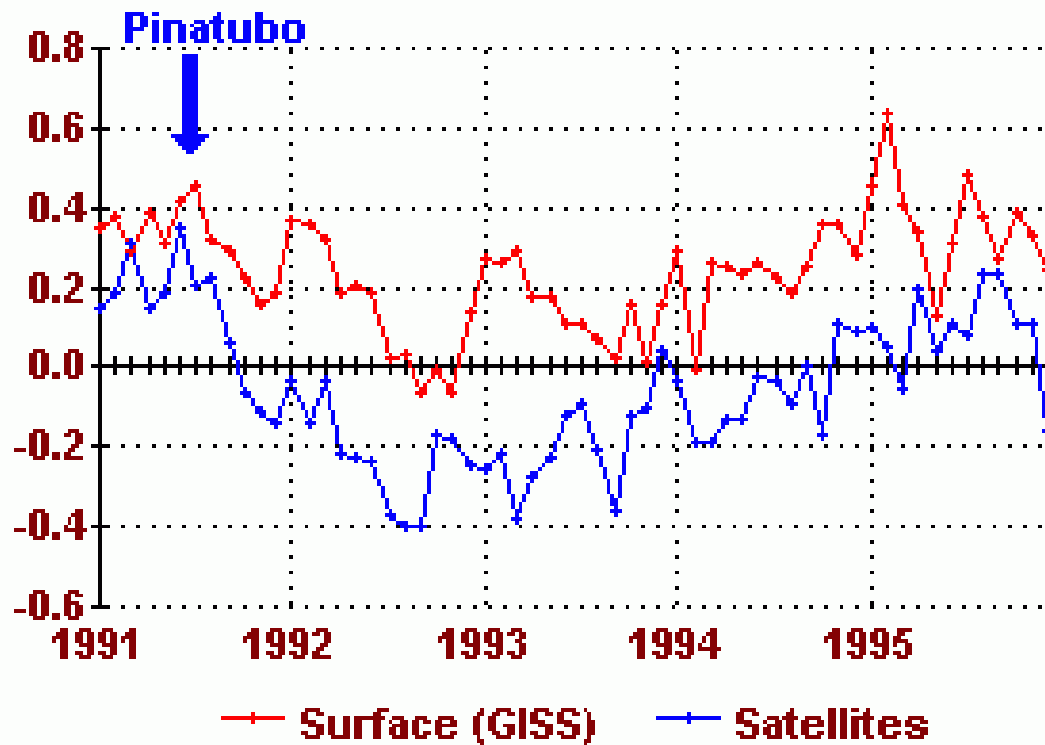


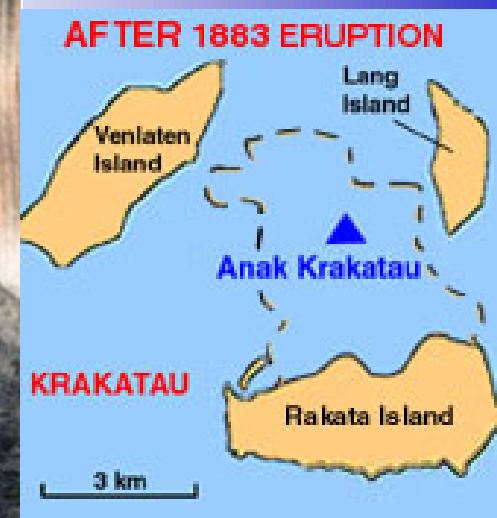
Mount Pinatubo in the Philippines after 1991 eruption



Surface v. Satellites 1991-1995

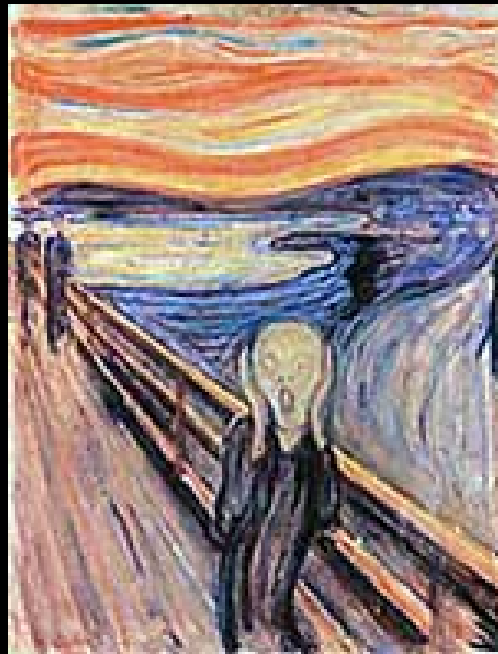
Global Temperature Anomalies [$^{\circ}\text{C}$]



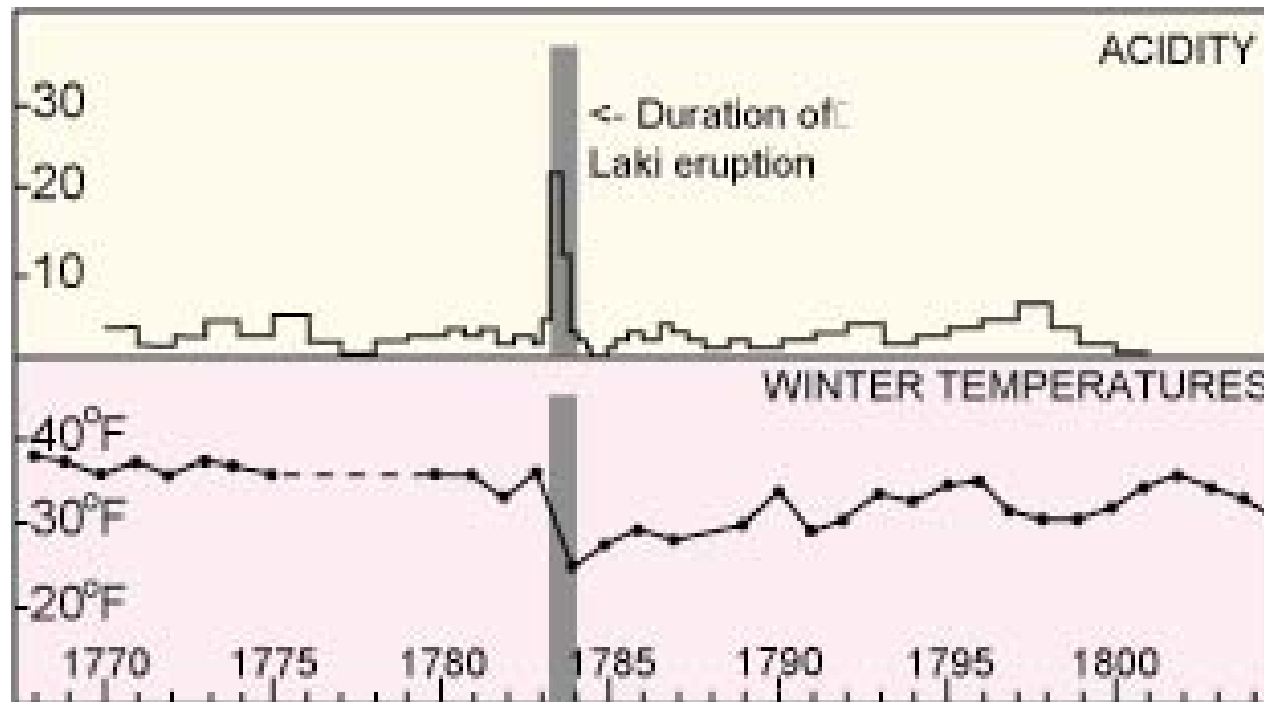




Sunset colors, Thames UK 188311



Skriget; EdvardMunch 1883



Central England air temperatures

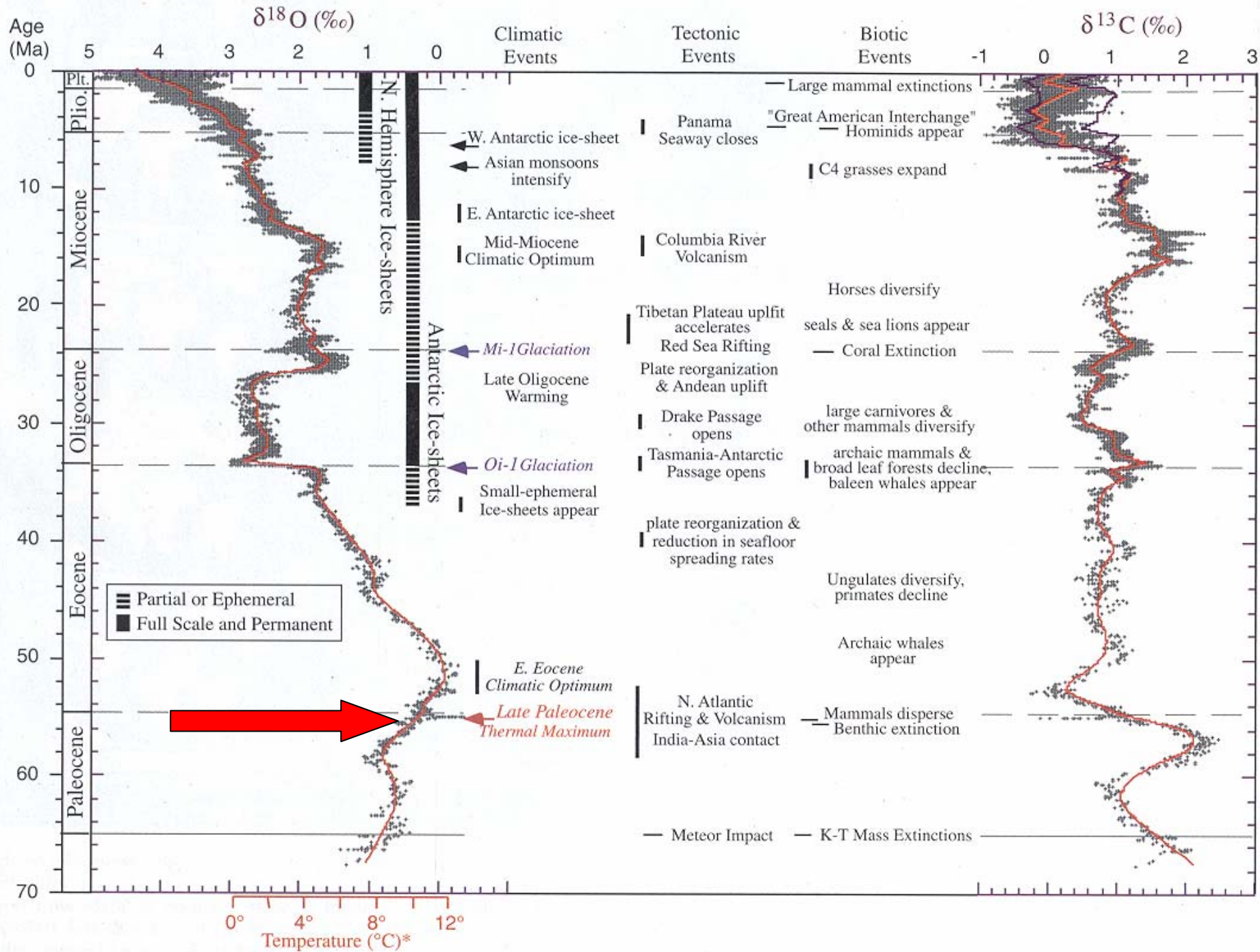


Fig. 2. Global deep-sea oxygen and carbon isotope records based on data

fractionation that exceeds -1.0% in some intervals. Prior to 15 Ma

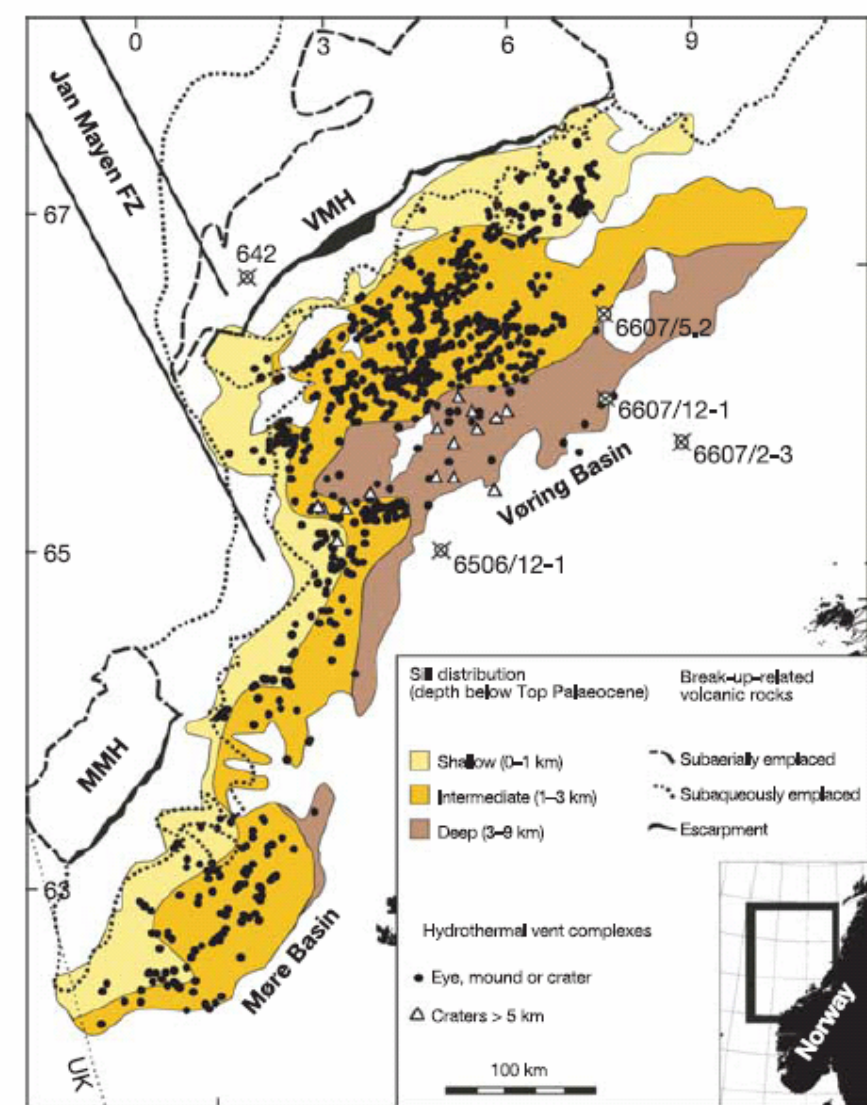
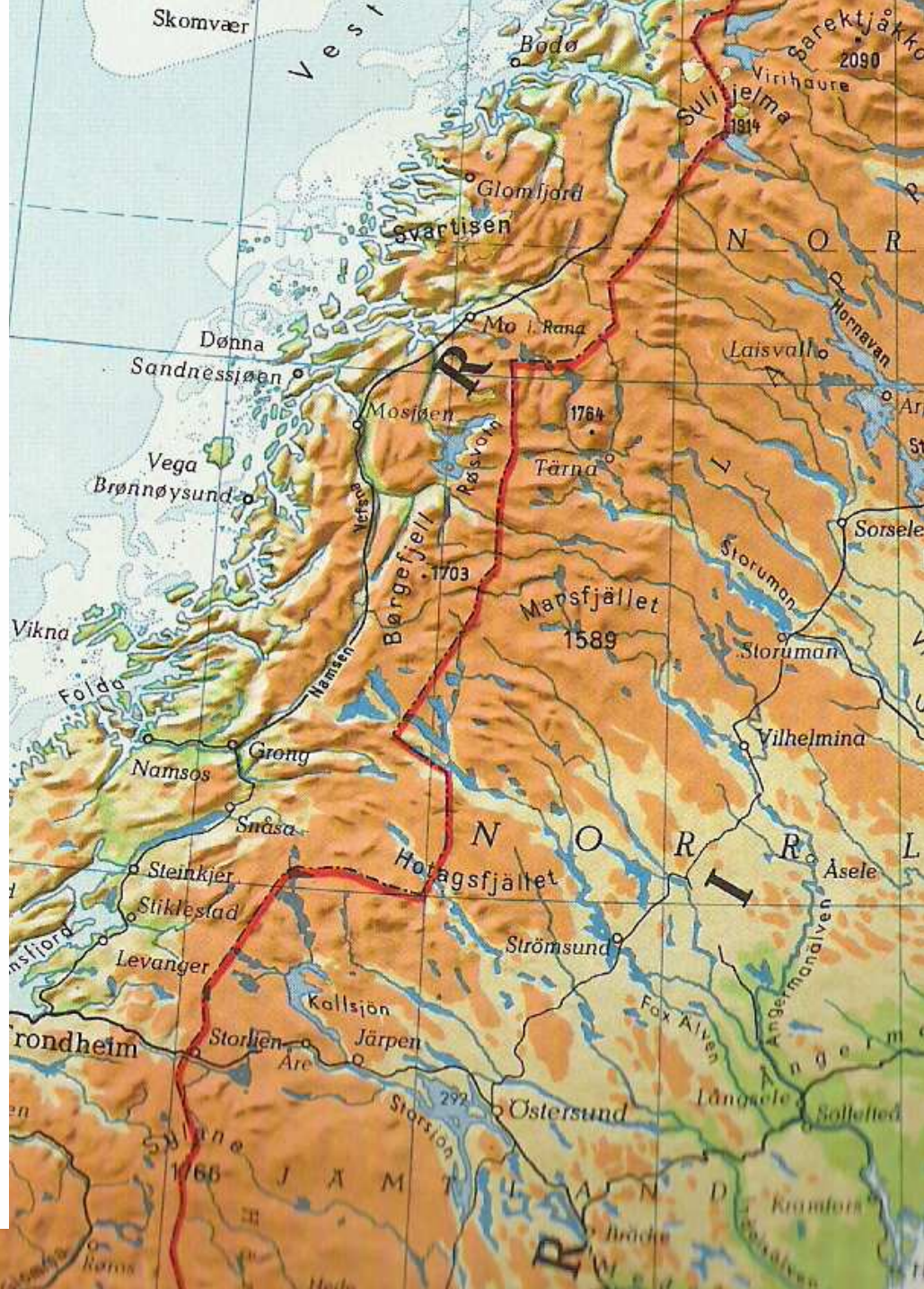


Figure 1 Distribution of hydrothermal vent complexes and volcanic intrusive and extrusive complexes on the mid-Norwegian continental margin. The map is based on detailed seismic mapping of >150,000 km of high-quality 2D seismic data and one 3D seismic survey (see Methods). Extrusive domains modified from ref. 31. The 'Inner Flows' is the subaqueous lavas emplaced landward of the escarpments. VMH, Vøring Marginal High; MMH, Møre Marginal High; FZ, fracture zone.



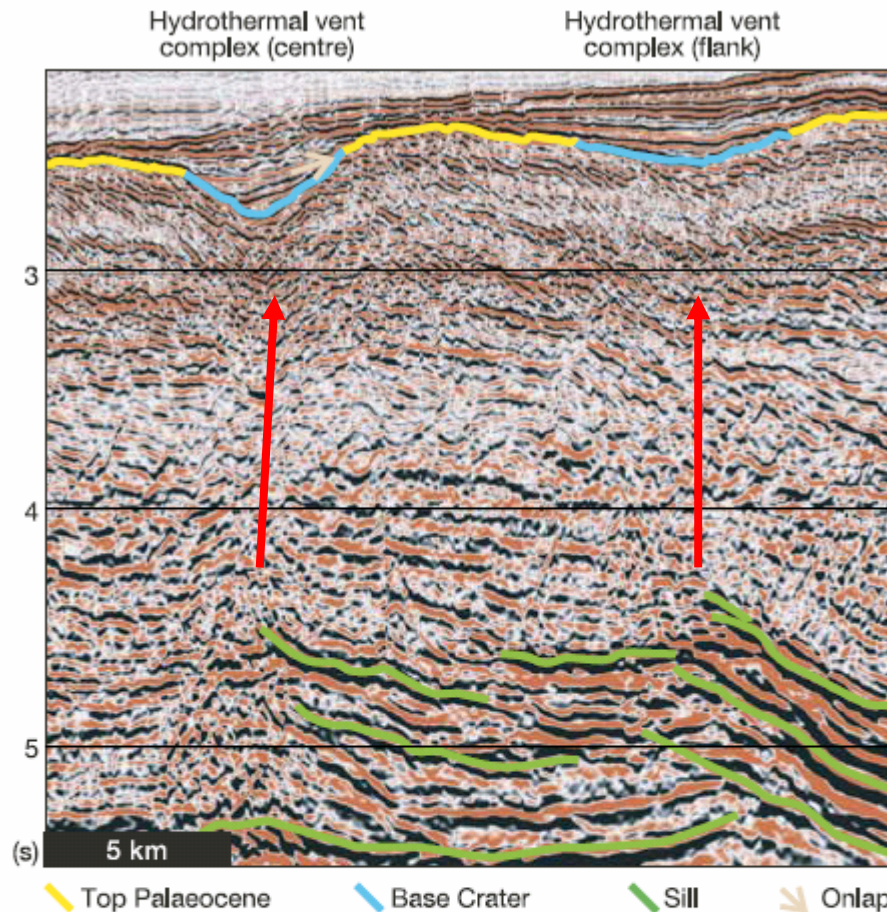


Figure 2 Seismic example of hydrothermal vent complexes in the southeast Vøring Basin. Two ~5 km-wide explosion craters are located at the Top Palaeocene level. The craters document the explosive power of the phreatic eruptions forming the hydrothermal vent complexes. Note the erosional base of the craters, onlapping sedimentary strata, disrupted chimney zones surrounded by inward-dipping strata below the craters, and a deep sill complex terminating below the craters. The craters are fairly rare (9%). The upper part of most hydrothermal vent complexes are eye-shaped (61%) or dome-shaped (30%), and less than 2 km in diameter (62%). Most hydrothermal vent complexes originate above the termination of a transgressive sill reflection, as shown by this example. Time shown in seconds (s) is the two-way travel-time for the seismic pulse.

Warming of sediments converts organic carbon into methane, which may be released explosively.

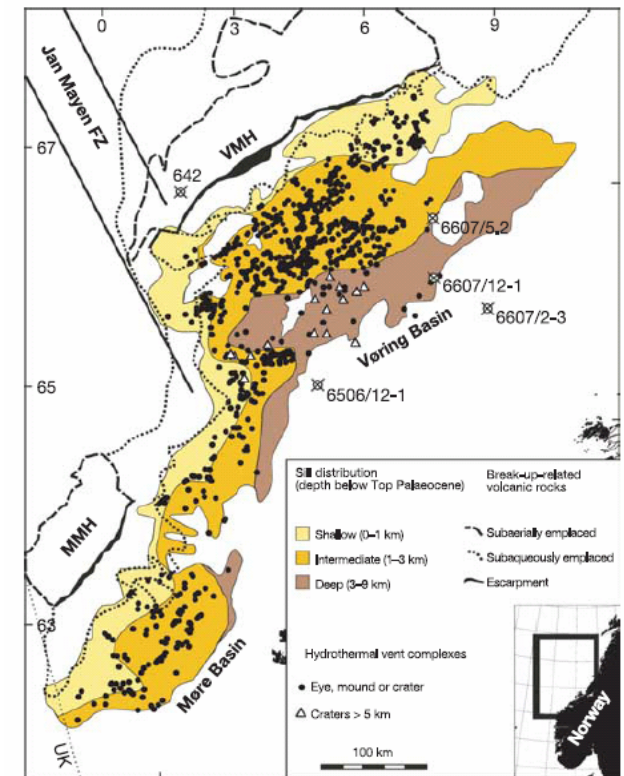


Figure 1 Distribution of hydrothermal vent complexes and volcanic intrusive and extrusive complexes on the mid-Norwegian continental margin. The map is based on detailed seismic mapping of > 150,000 km of high-quality 2D seismic data and one 3D seismic survey (see Methods). Extrusive domains modified from ref. 31. The 'Inner Flows' is the subaqueous lavas emplaced landward of the escarpments. VMH, Vøring Marginal High; MMH, More Marginal High; FZ, fracture zone.

Fullerenes and Extinction Events



CRETACEOUS



65

JURASSIC



PERMIAN
TRIASSIC



DENOVIAN
MISSISSIPPIAN



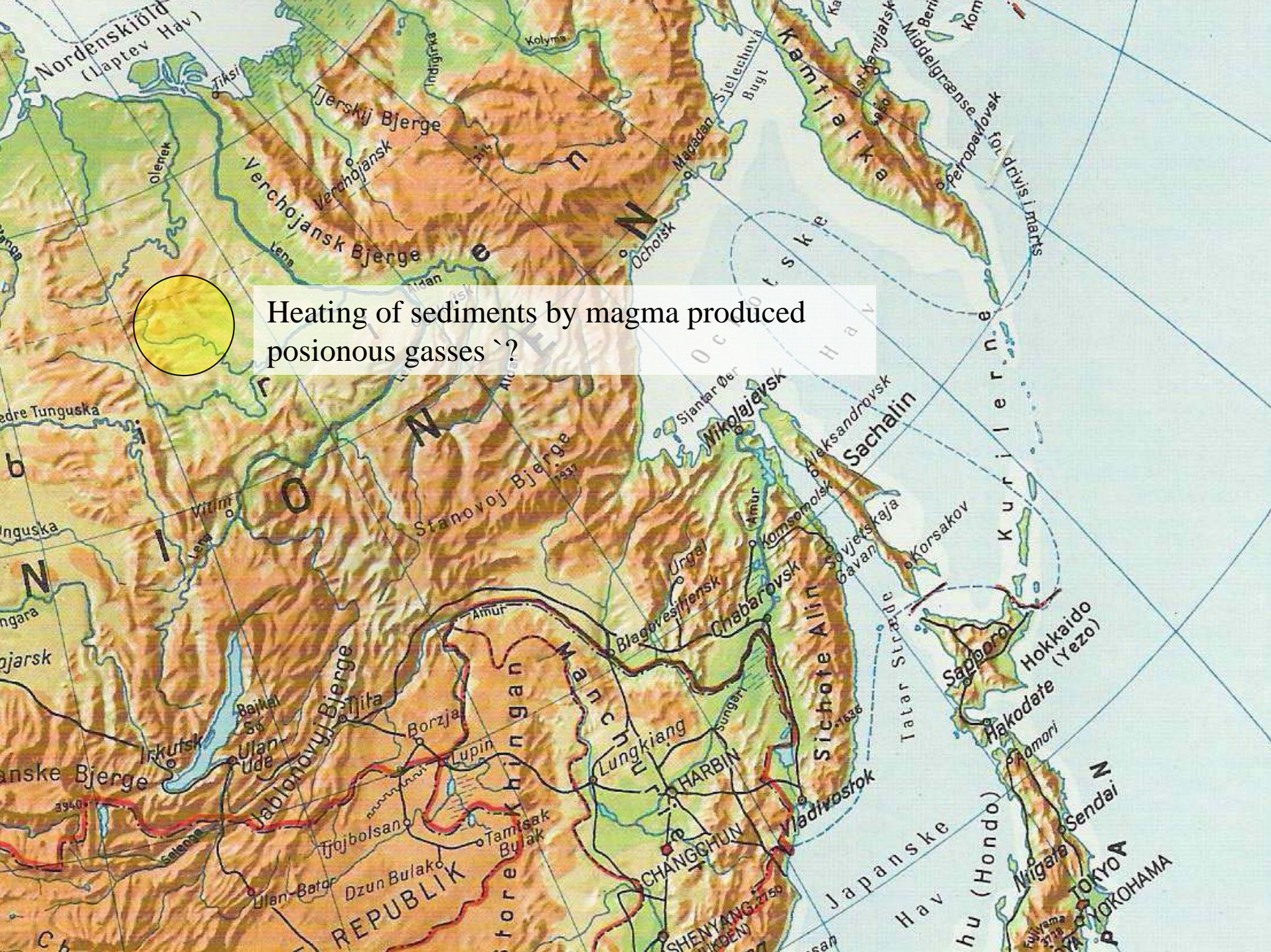
CAMBRIAN
ORDOVICIAN



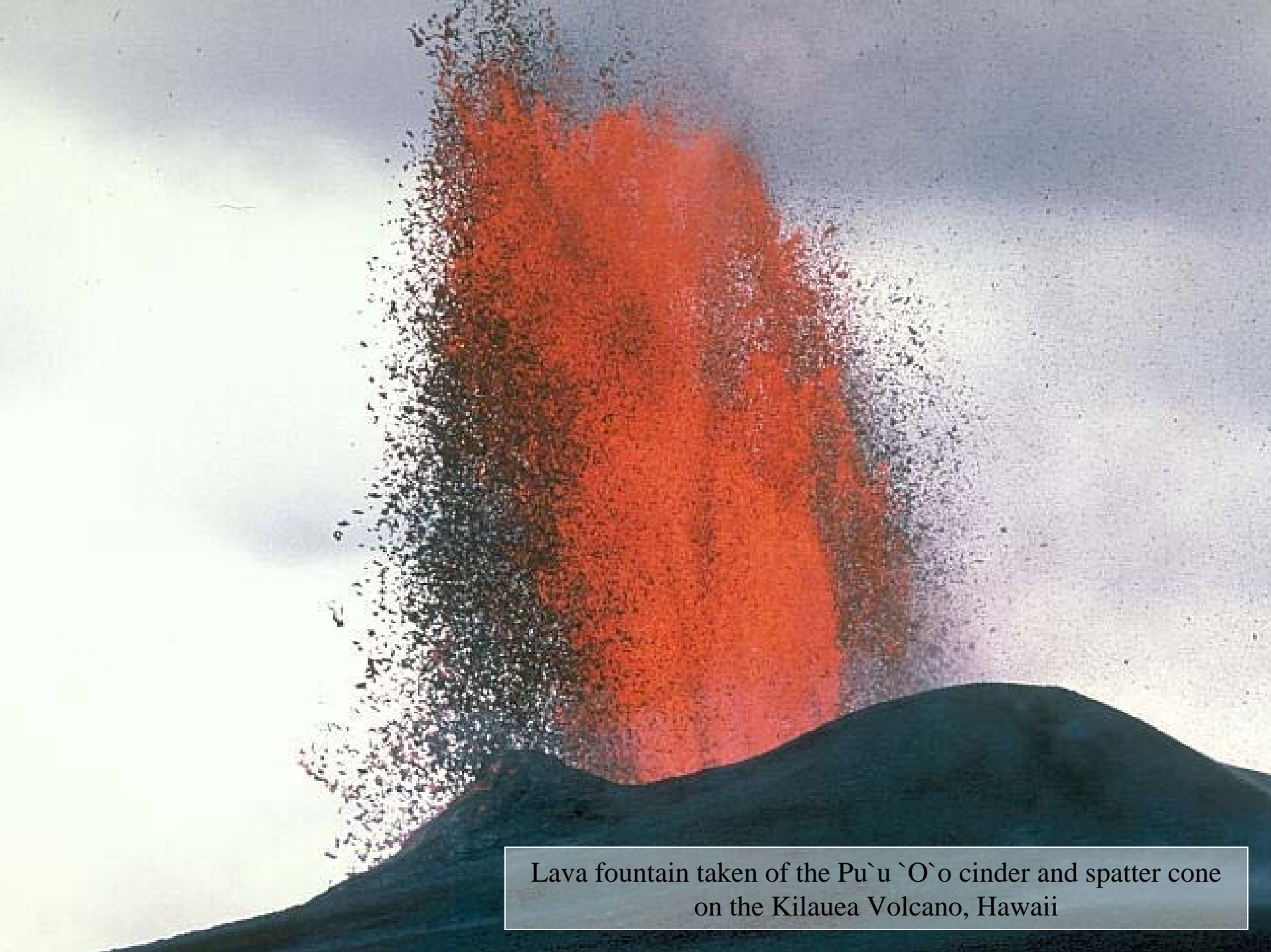
506

Million Years Ago





Heating of sediments by magma produced poisonous gasses?



Lava fountain taken of the Pu`u `O`o cinder and spatter cone on the Kilauea Volcano, Hawaii



Stromboli Volcano erupting incandescent molten lava fragments





Nonexplosive eruption Hawaii



Kupaianaha Lava Pond, Hawaii



Lava channel near a series of erupting vents on the northeast rift zone of Mauna Loa Volcano, Hawaii



Pahoehoe Lava Flow, Hawaii



Iceland



Iceland



Thurston Lava Tube, Hawaii



Qeqertarsuaq, Disko, central W Greenland



Disko, central W Greenland



Faroe Islands



Iceland



Iceland



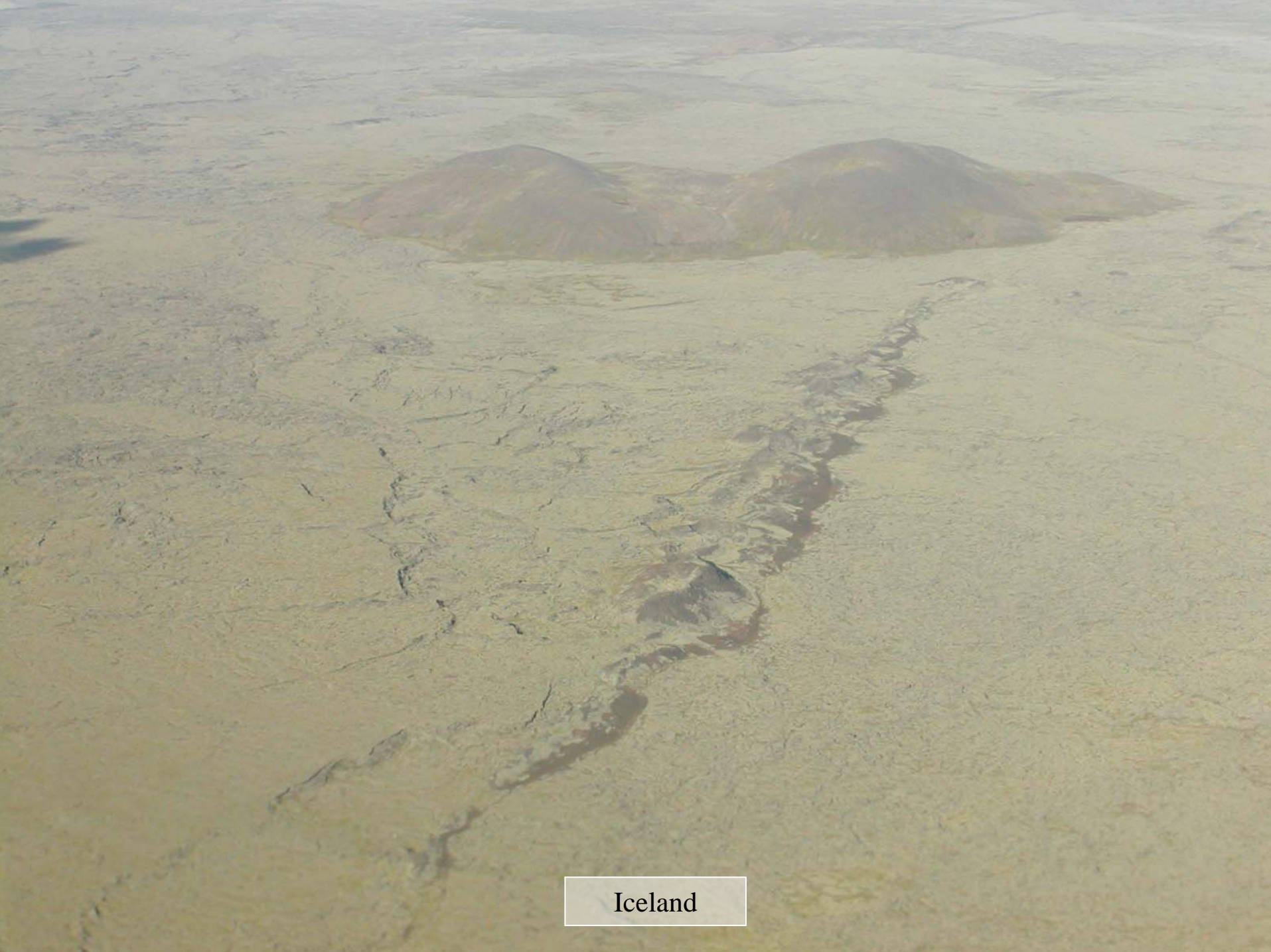
Iceland



Iceland








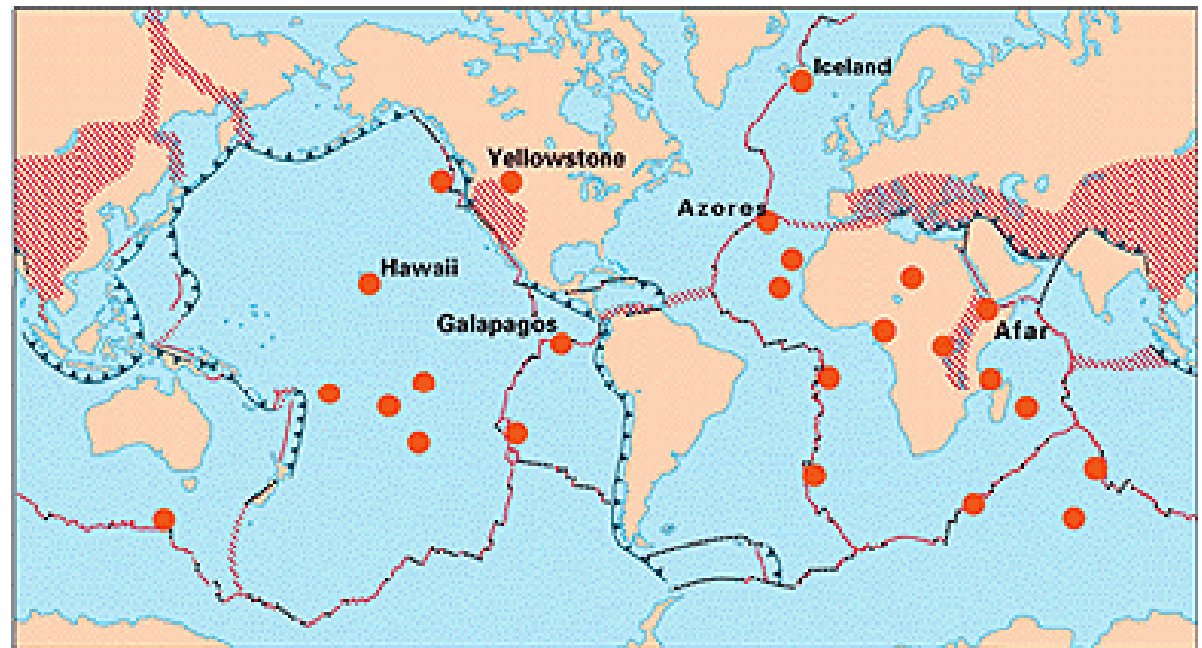
Iceland



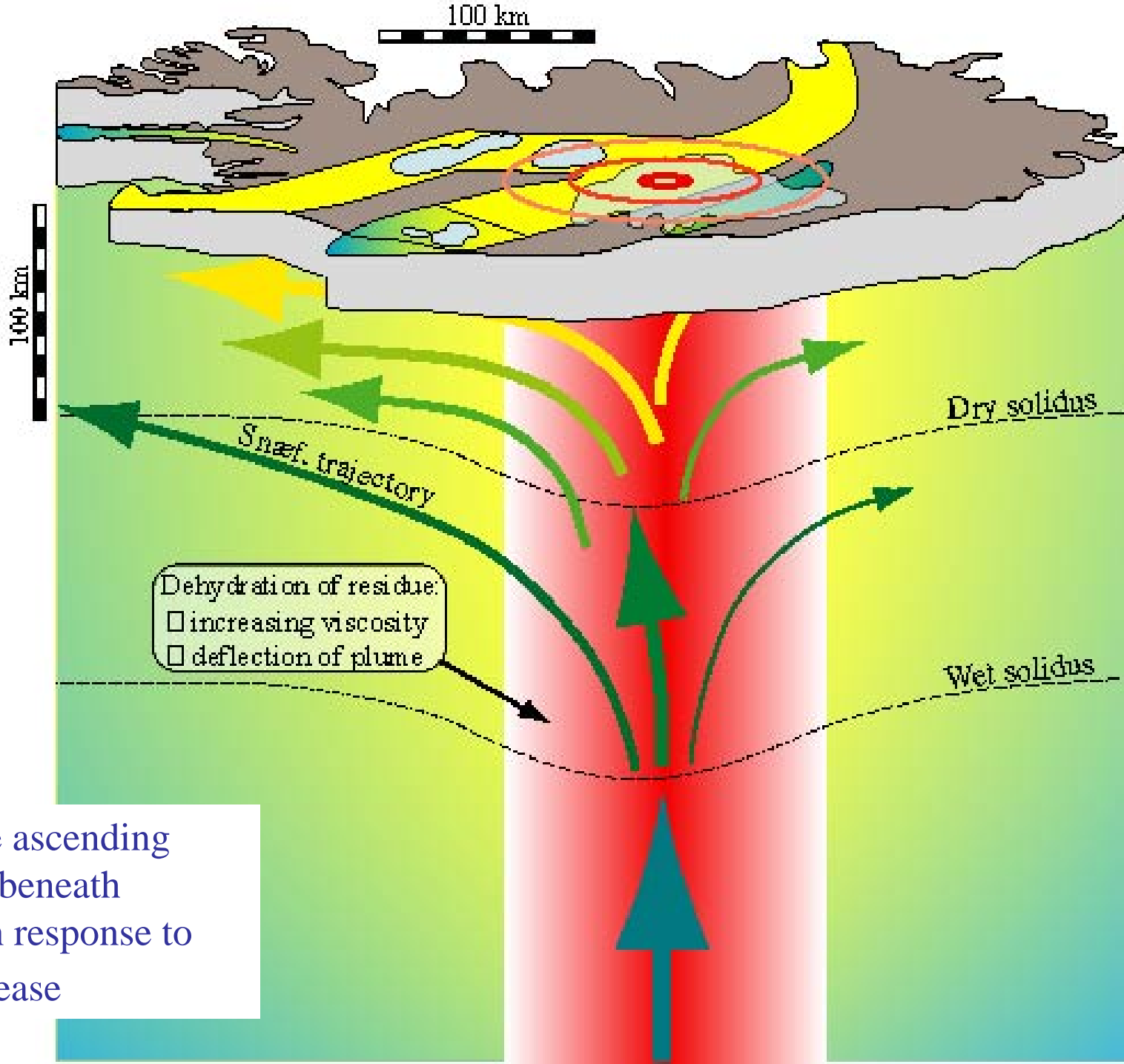
Iceland

EXPLANATION

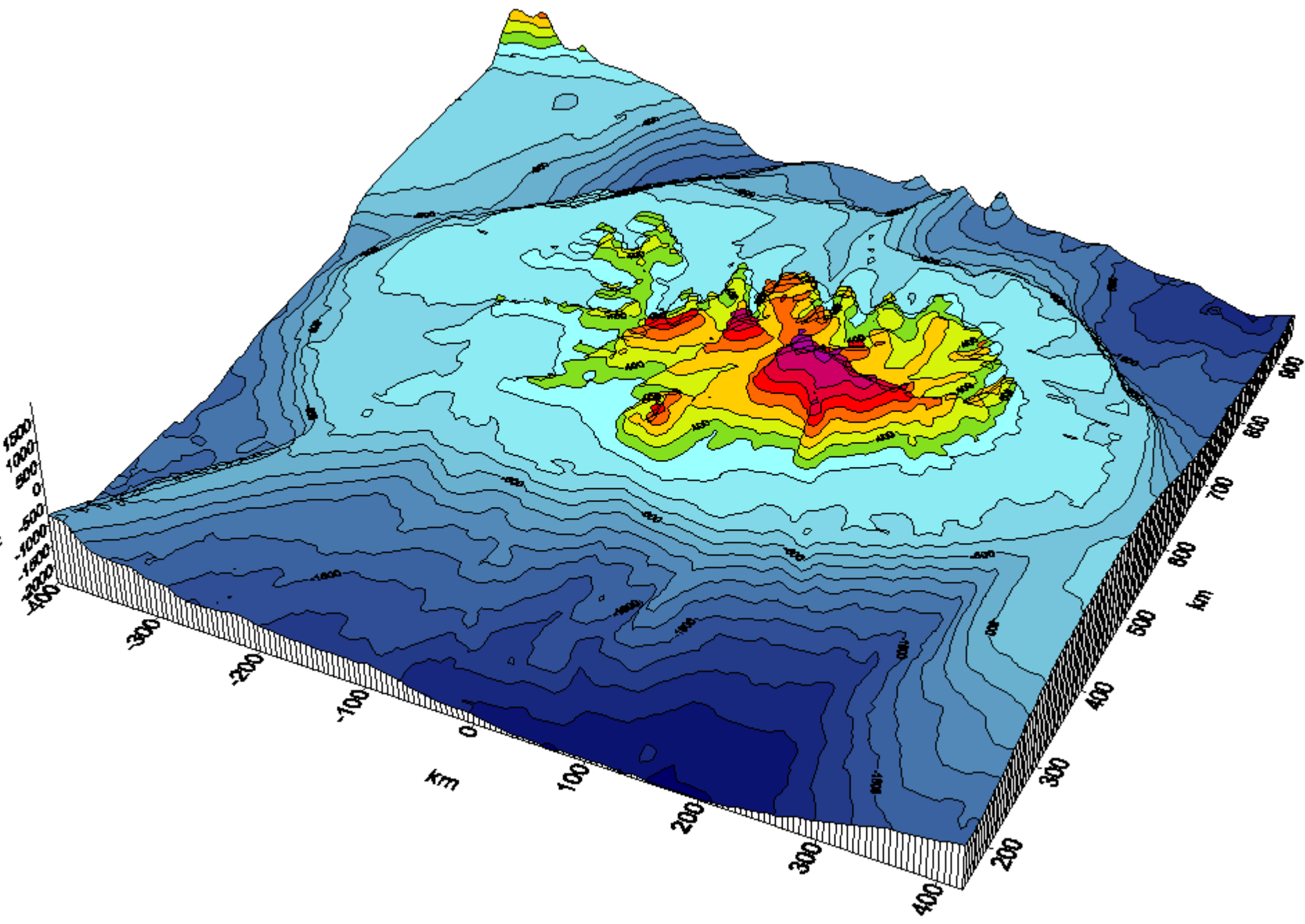
-  **Divergent plate boundaries—**
Where new crust is generated as the plates pull away from each other.
-  **Convergent plate boundaries—**
Where crust is consumed in the Earth's interior as one plate dives under another.
-  **Transform plate boundaries—**
Where crust is neither produced nor destroyed as plates slide horizontally past each other.
-  **Plate boundary zones—**Broad belts in which deformation is diffuse and boundaries are not well defined.
-  **Selected prominent hotspots**

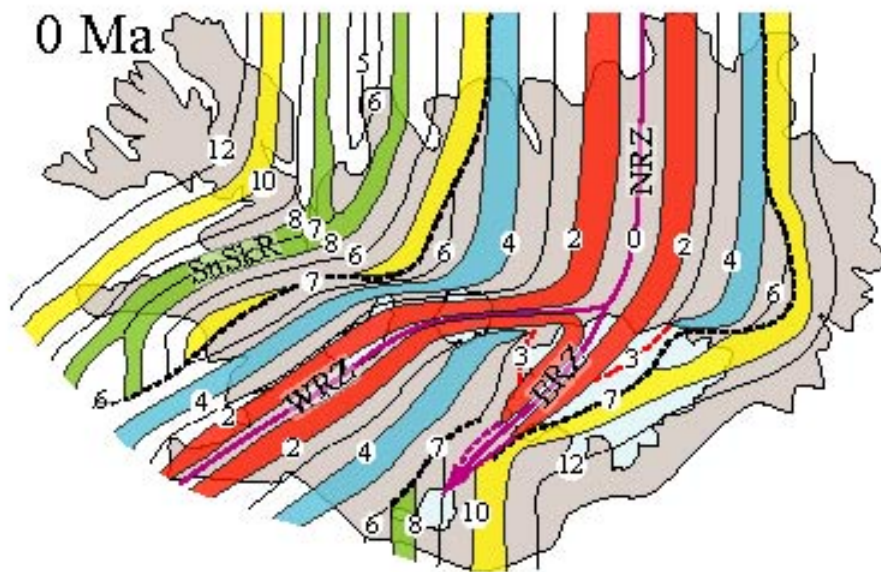
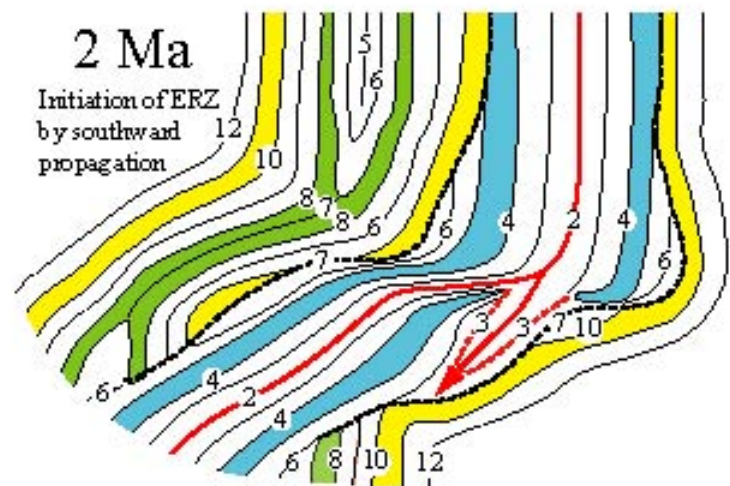
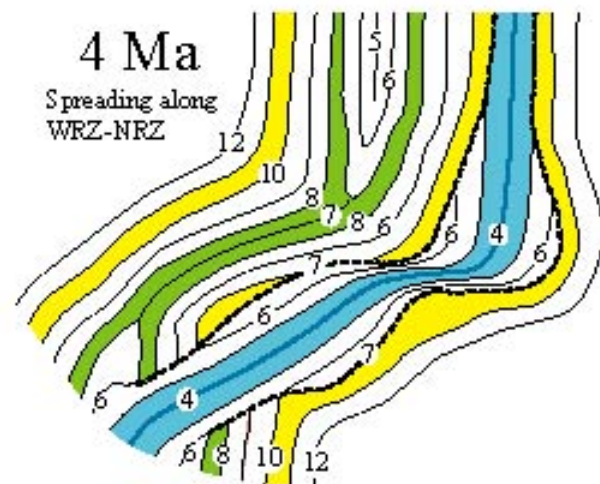
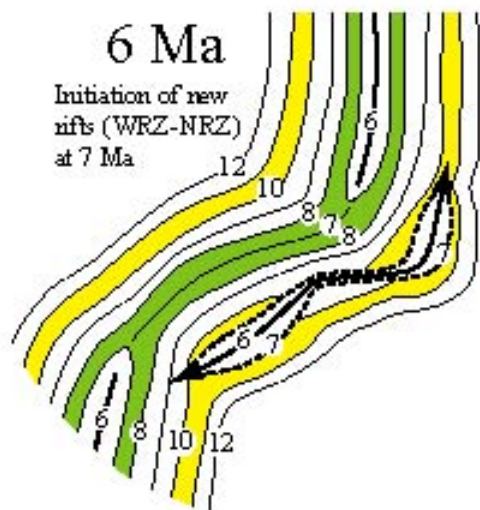
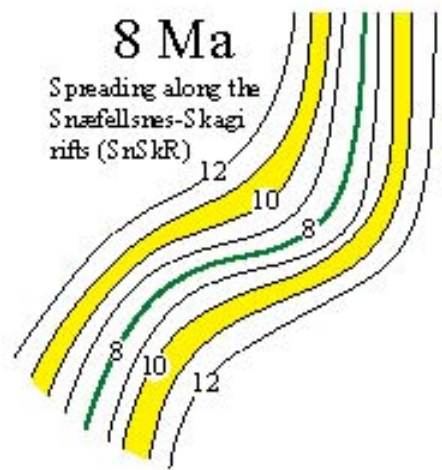


Hotspots



Hot plume; The ascending mantle column beneath Iceland melts in response to the pressure release









Subglacial
volcanoes



Land of ice and fire



...sten aus gesehen. Die Zeichnung
...onsstelle zwischen den Vulkanen
...nga. Die graue Linie markiert den
...len Wasserabfluß des Jökulhlaup.

...wing / Zeichnung: Morgunblaðið





Iceland 1996



Iceland 1996