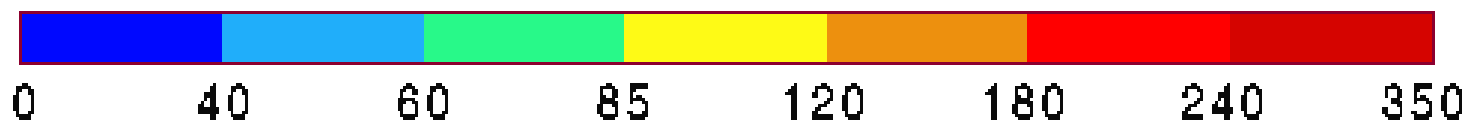
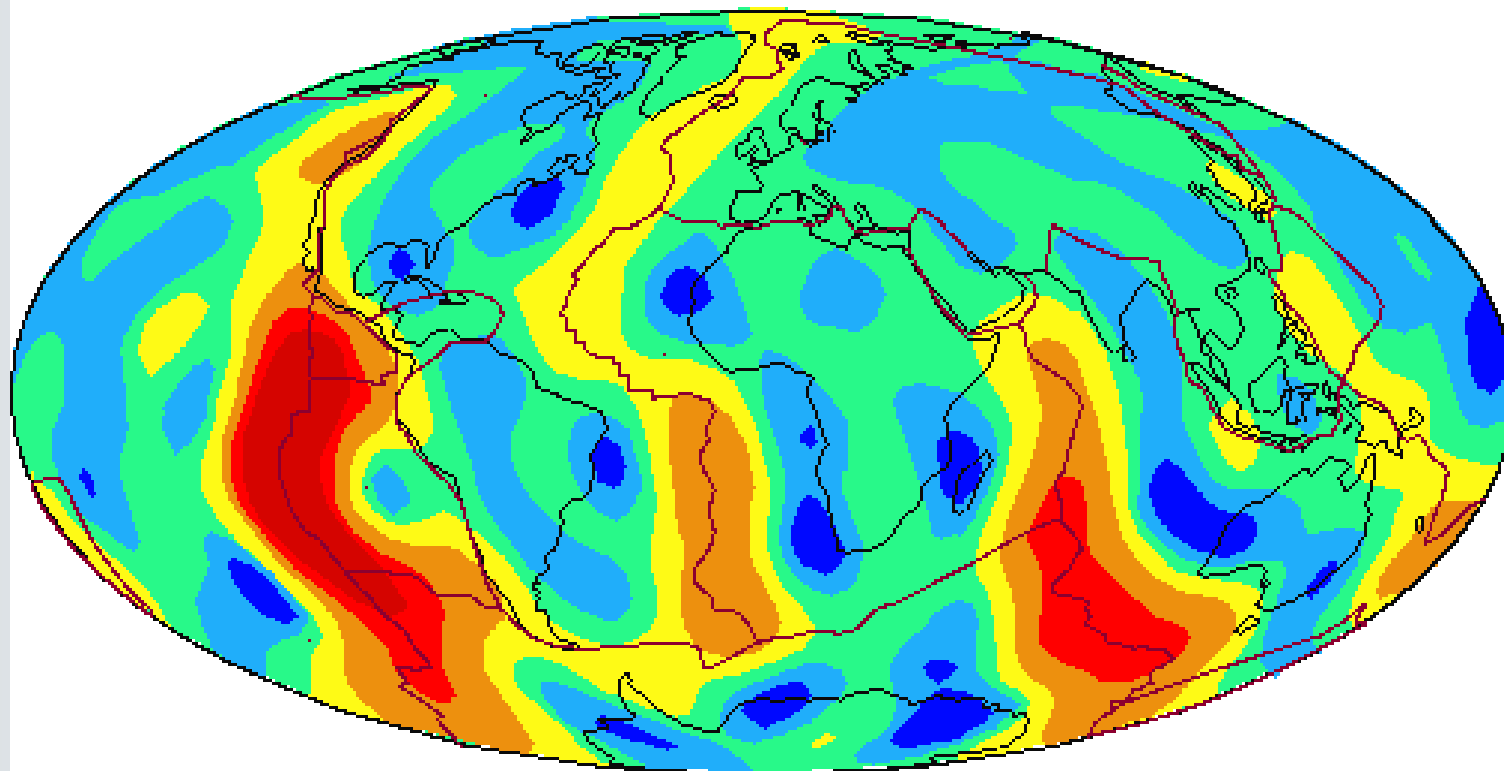


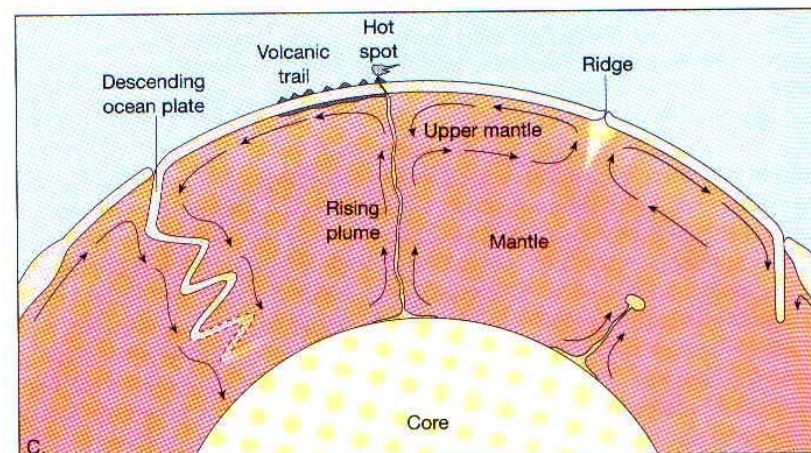
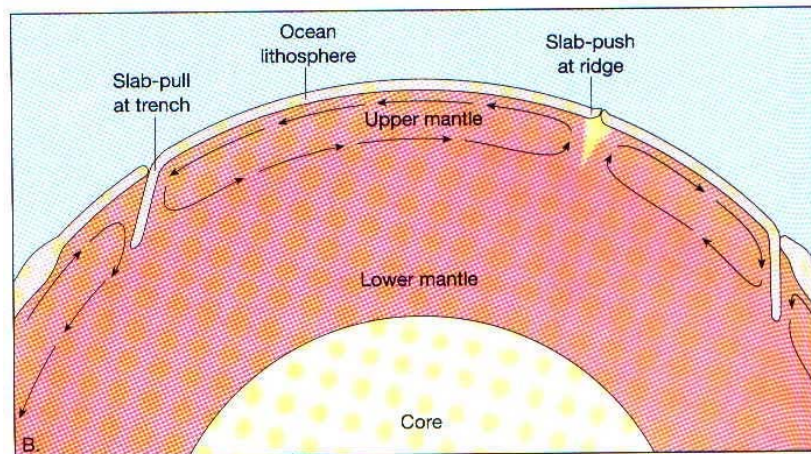
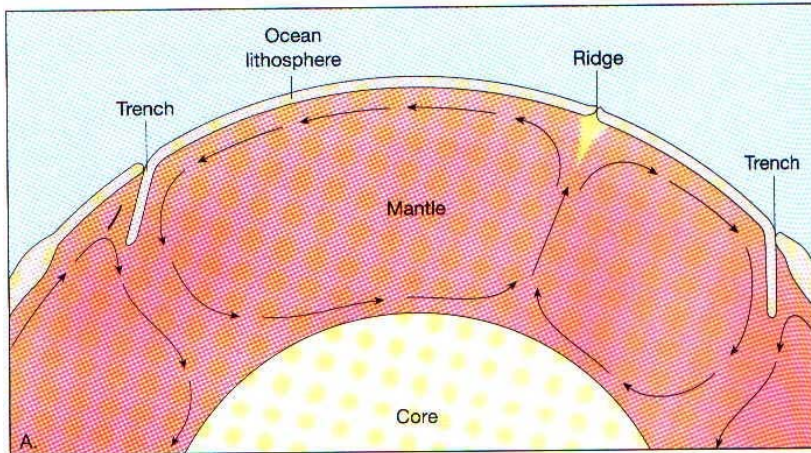
# Geotermie a dynamika sedimentárních pánví

Tepelný tok



$\text{mW m}^{-2}$

# Mantle Heat Transfer

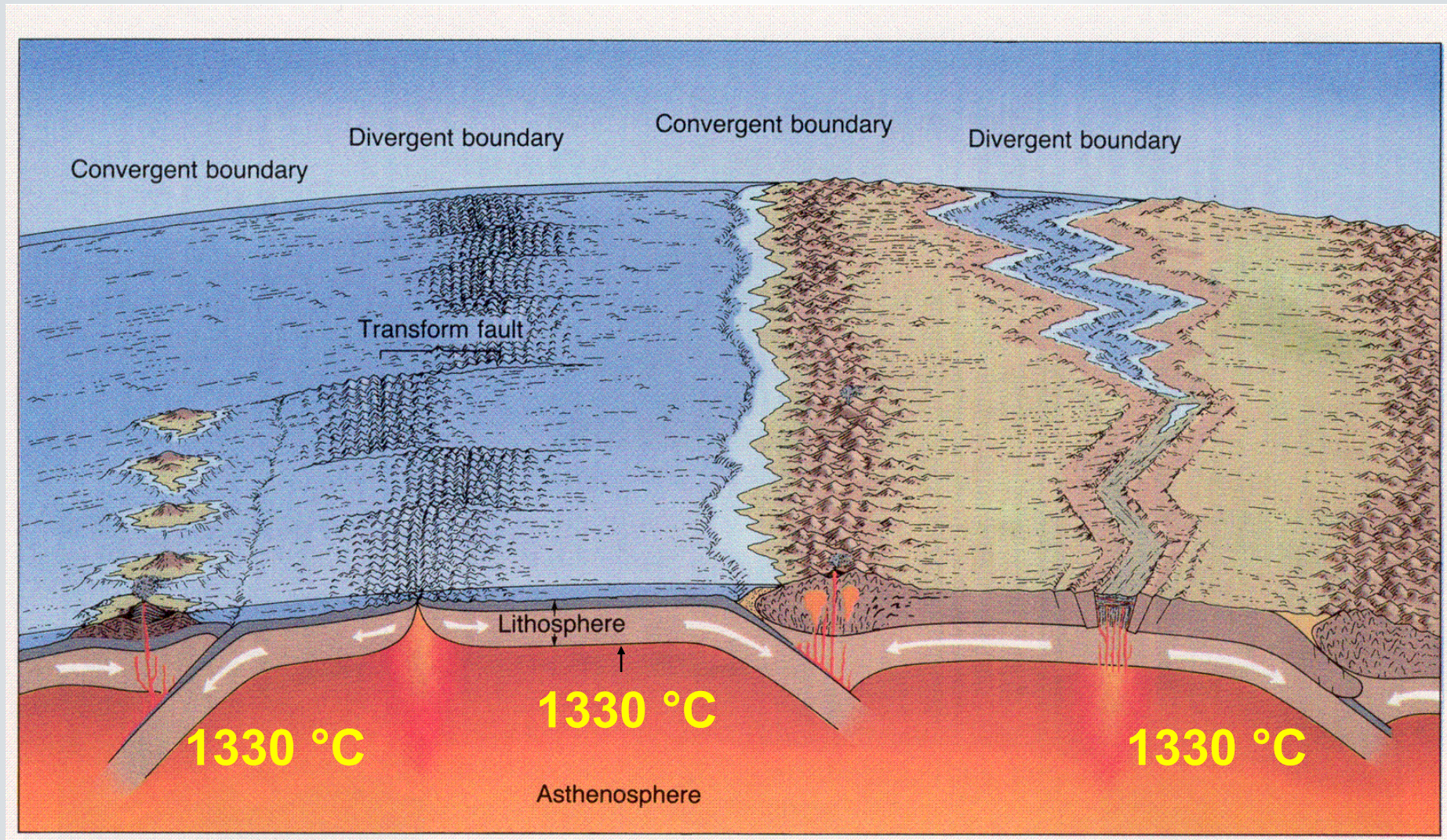


## Convective Heat Transfer in the Mantle

## Origin of the Hot Spots

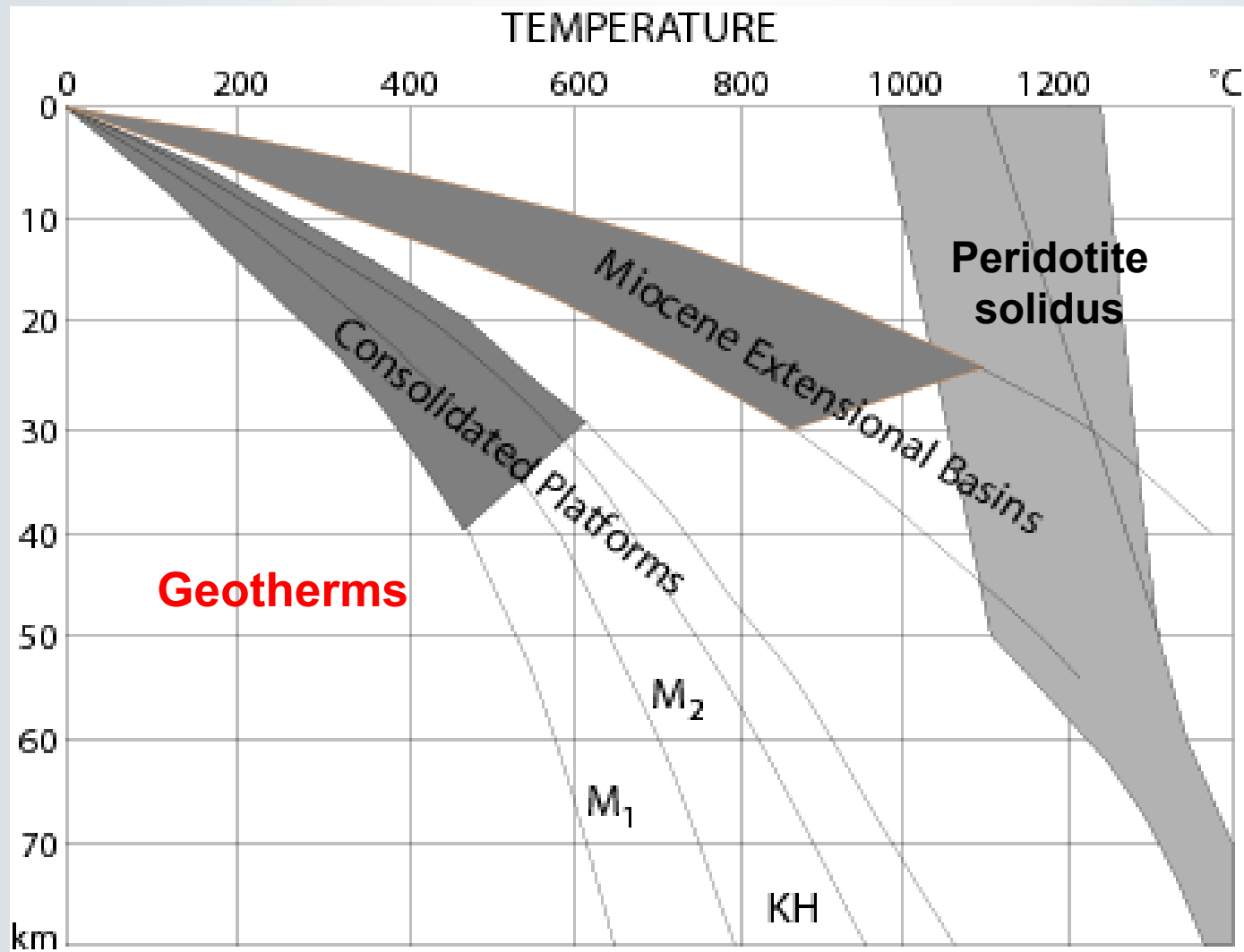


# Teplota na bázi litosféry



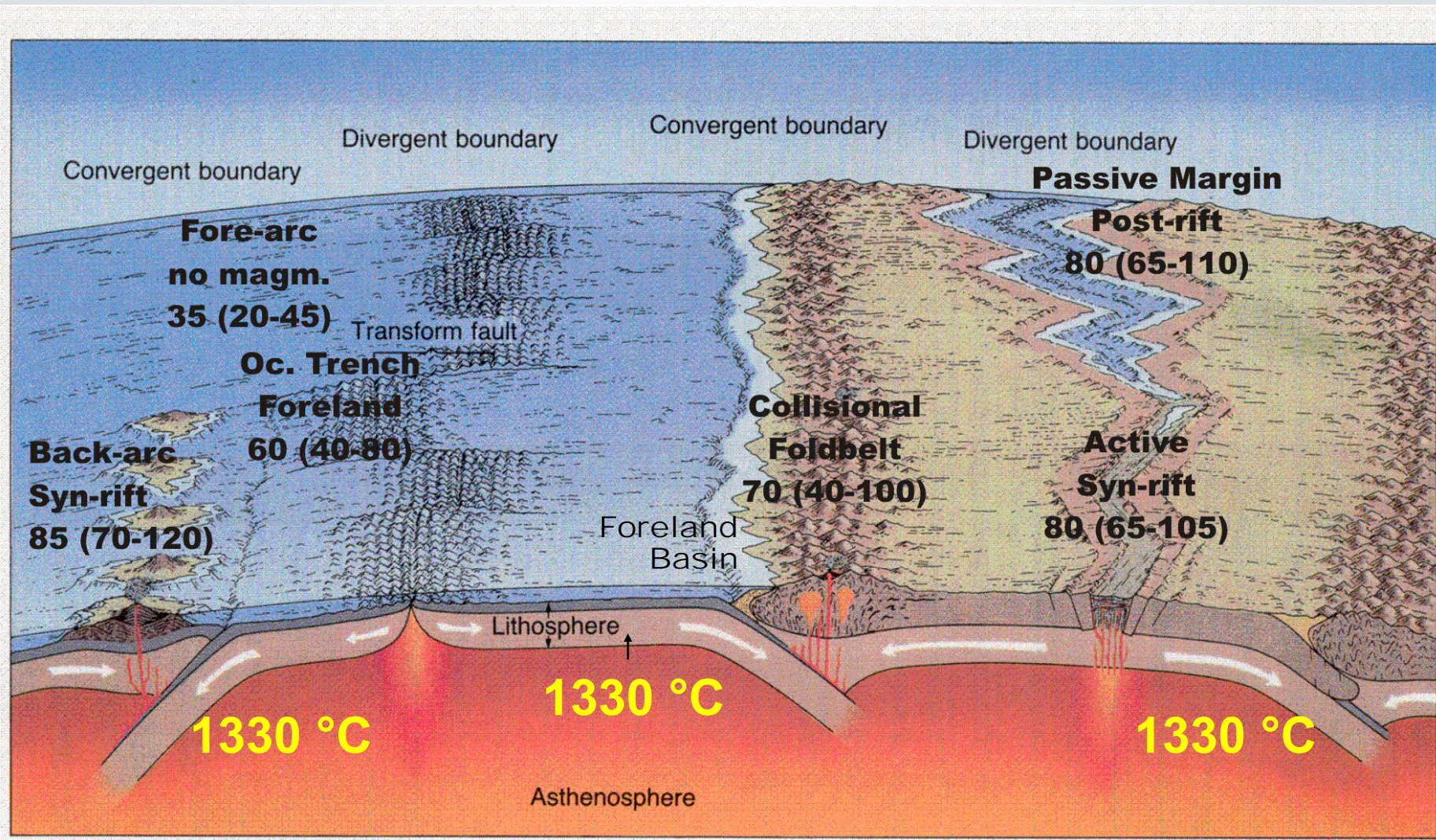


# Geotermický gradient = $dT/dZ$ (mK/ m)





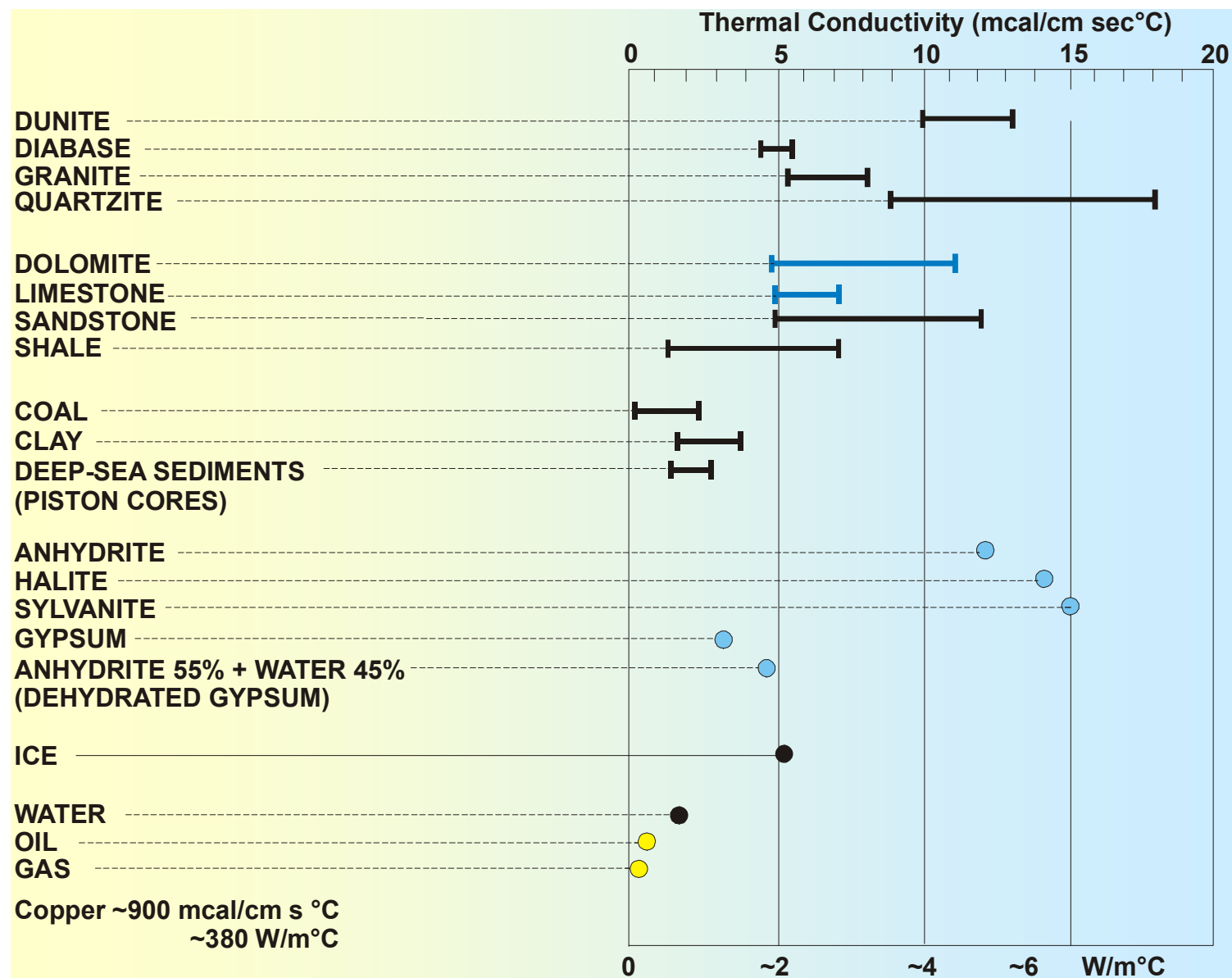
# Tepelný tok ( $\text{mW.m}^2$ )



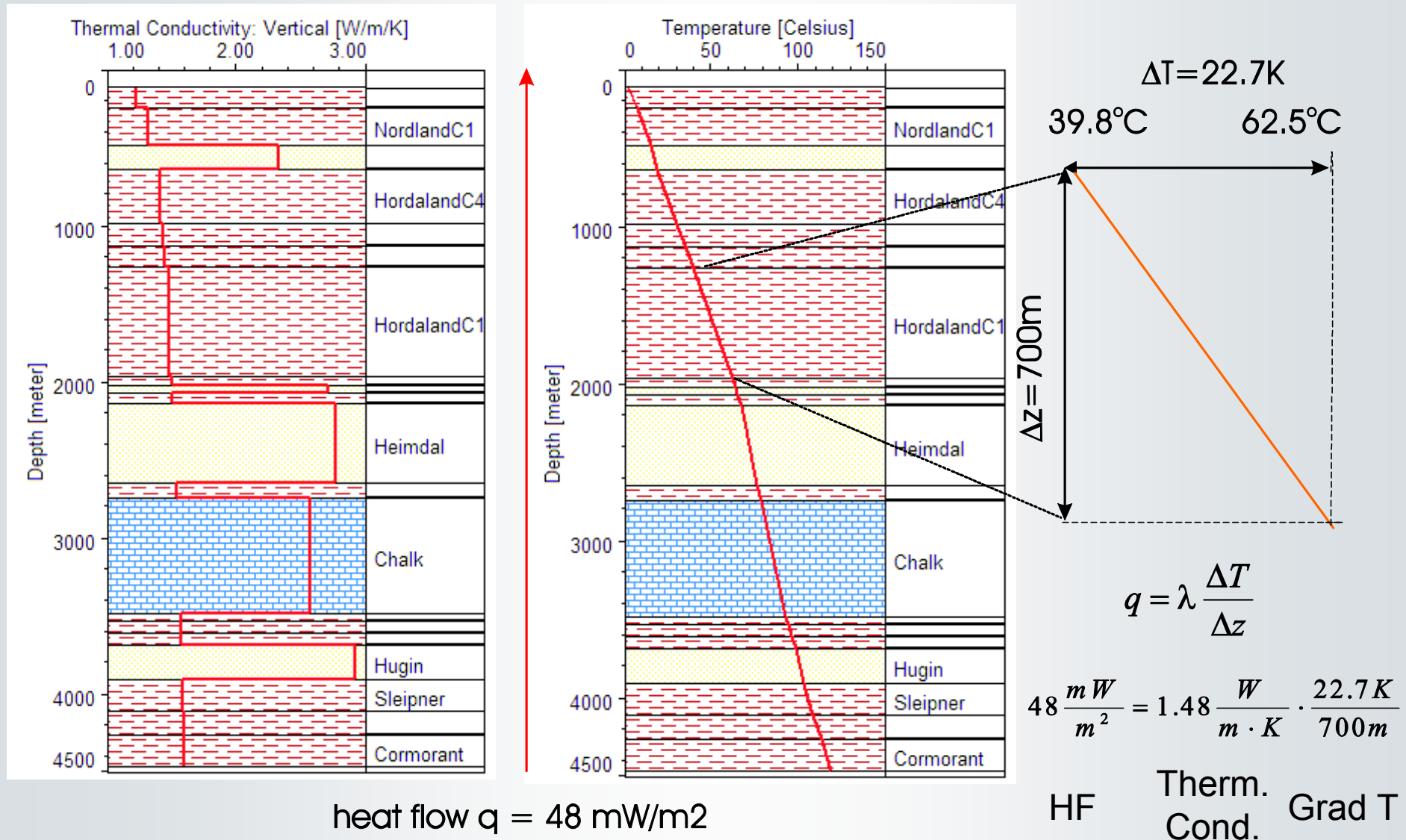
*Data from Allen & Allen (1990)*



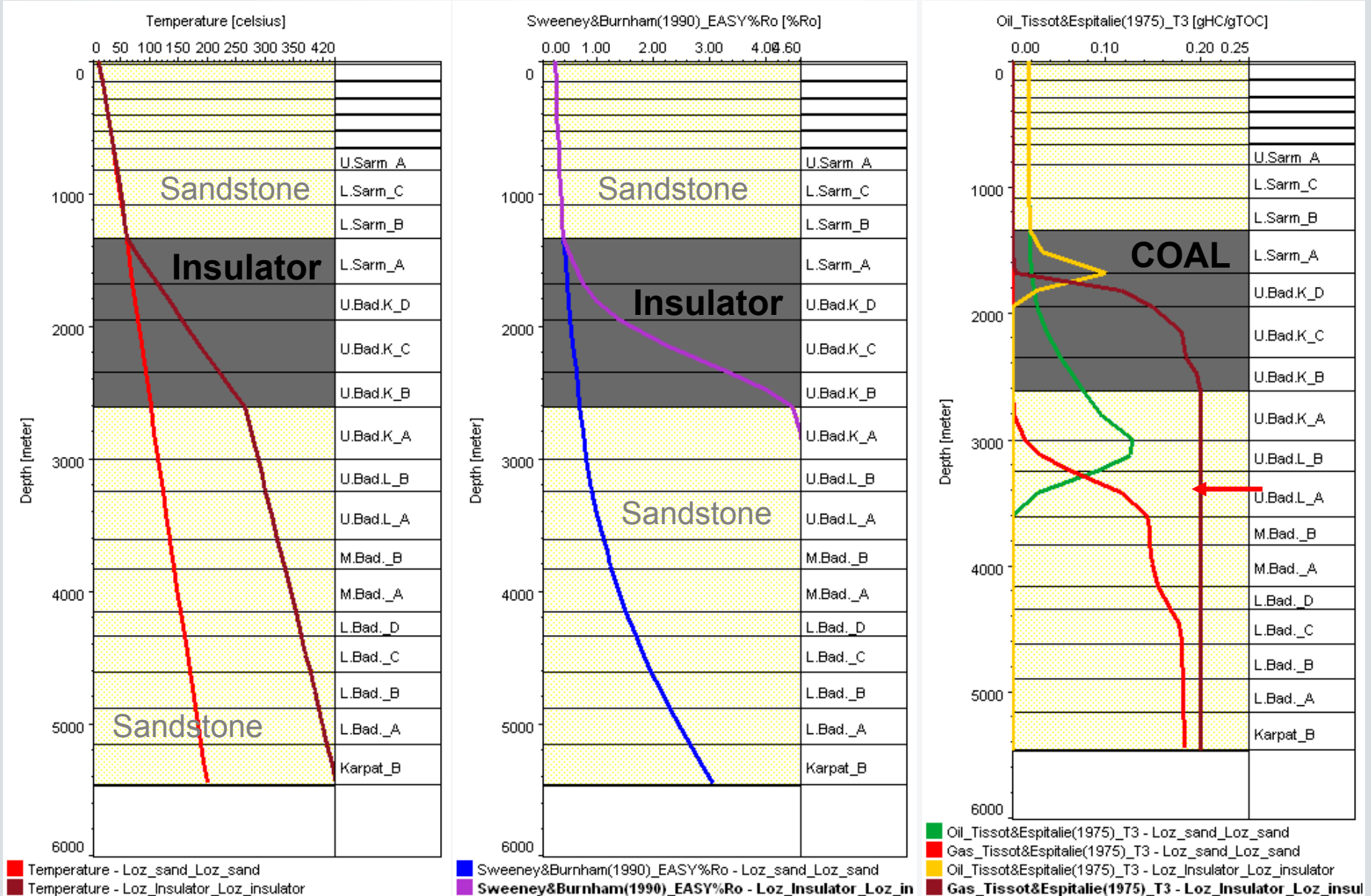
# Tepelná vodivost



# 1D tepelná vodivost a teplota

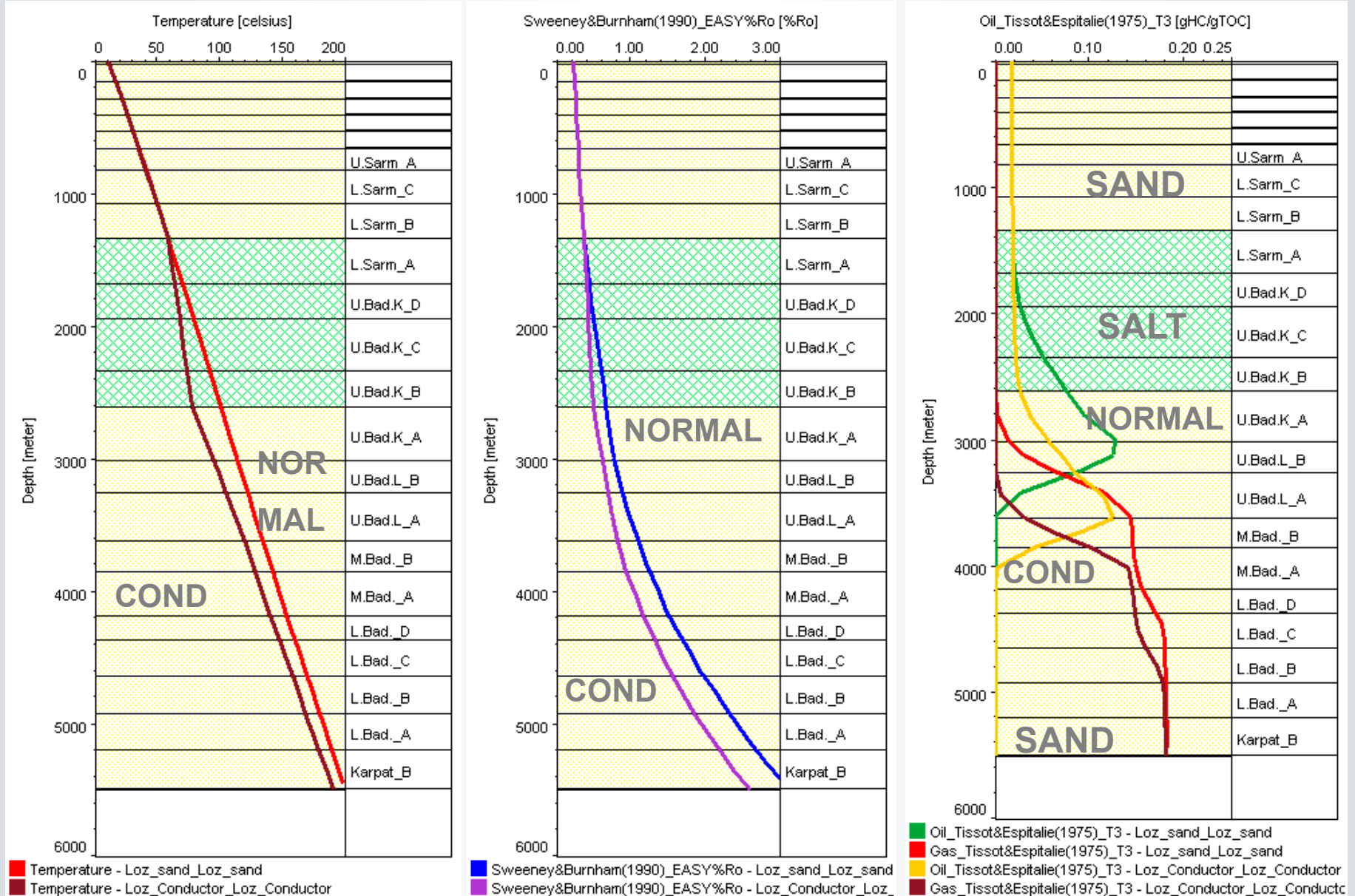


# Vliv tepelného izolantu (např uhlí)

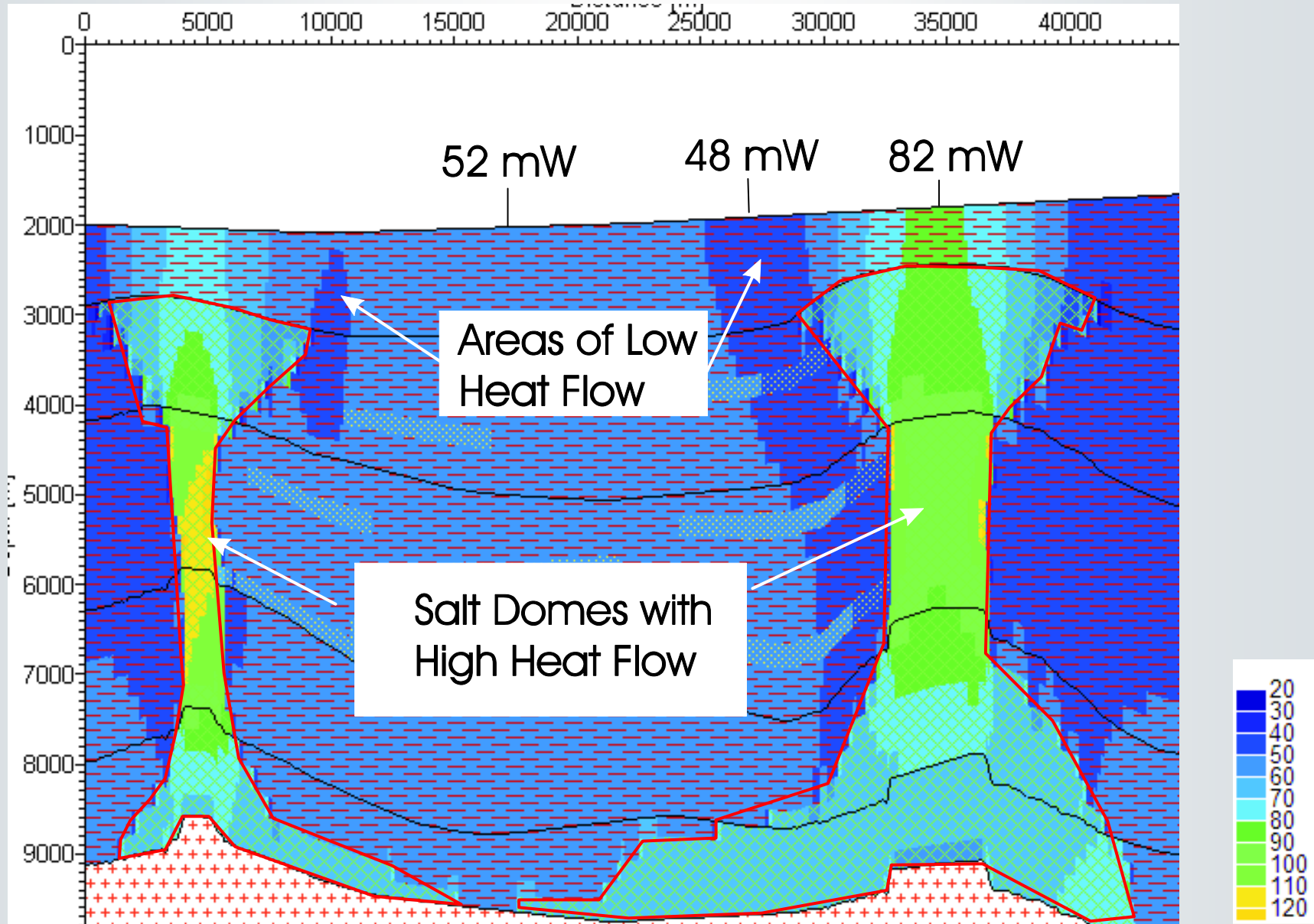




# Účinek tepelného vodiče

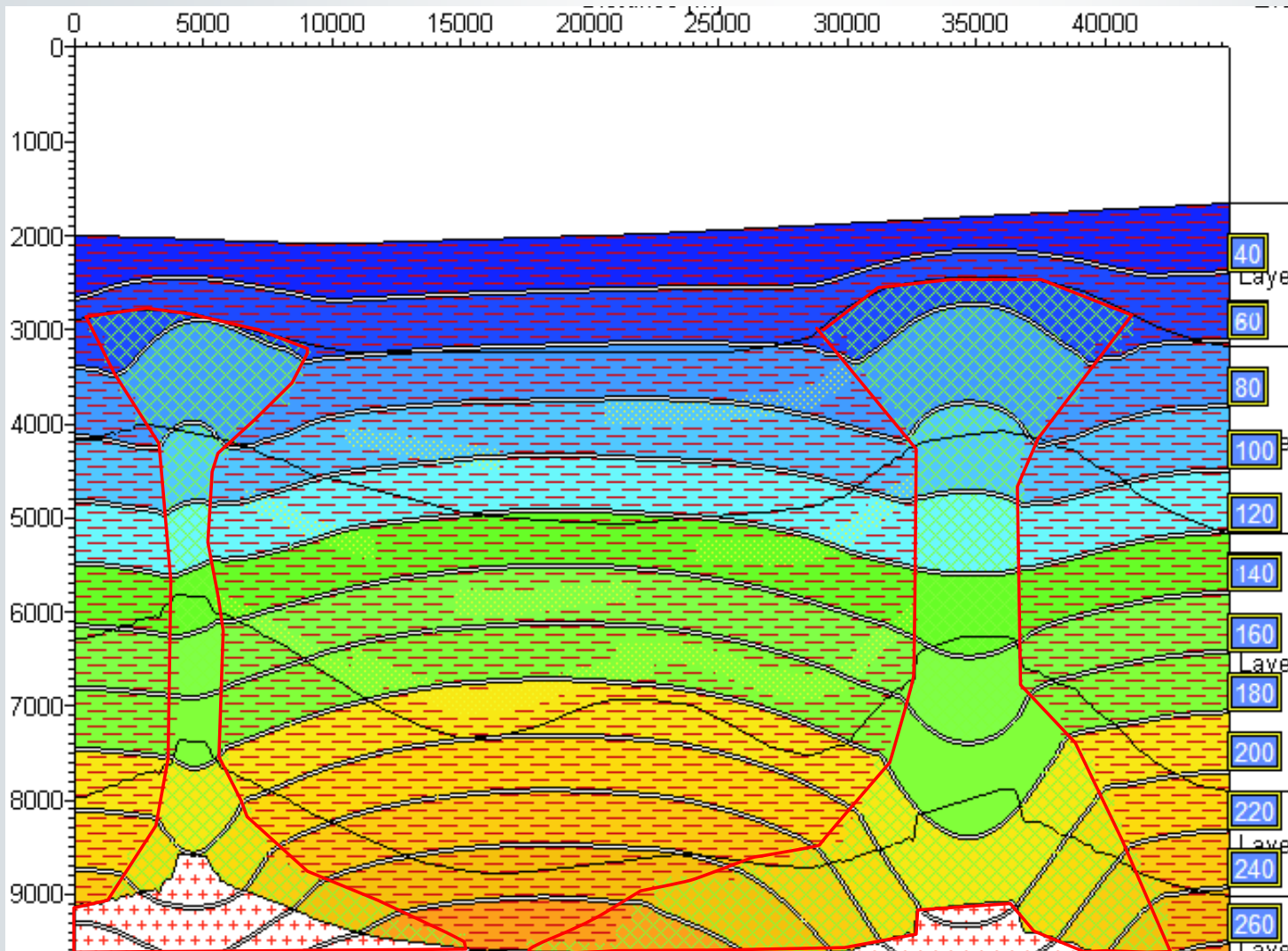


# Tepelný tok v solných diapírech





# Izotermy v solných diapírech



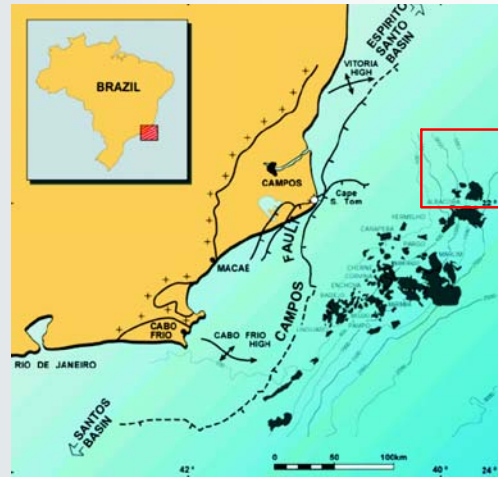
Isotherms are bent upwards at Top of Salt

Isotherms are bent downwards at Base of Salt

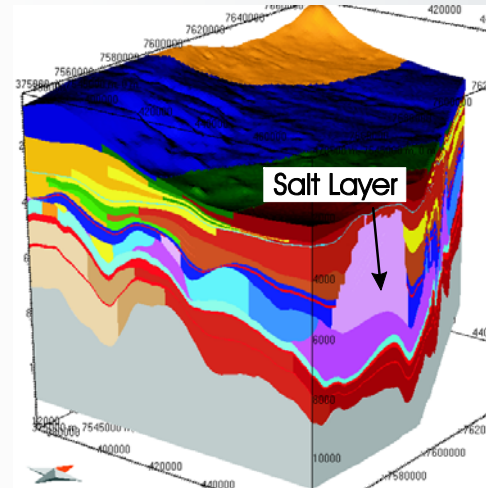
°C

# příklady – Campos Basin

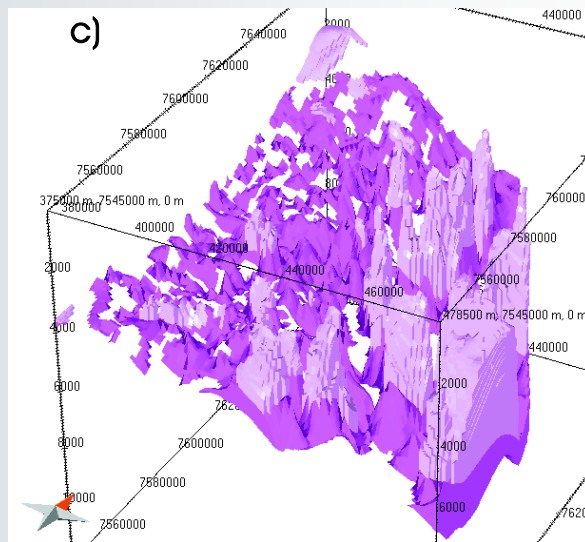
a)



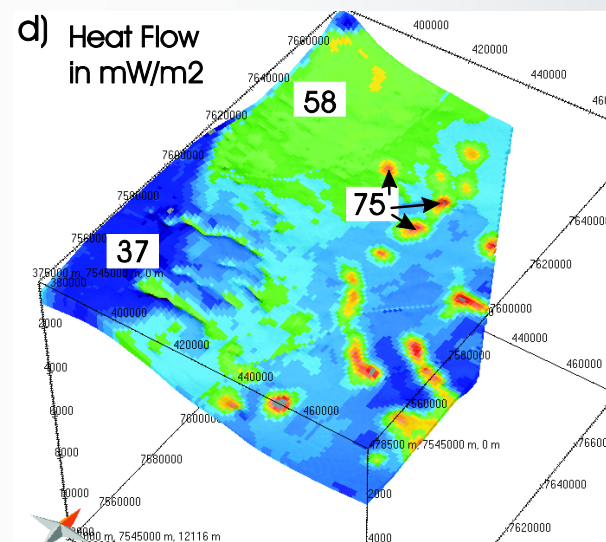
b)



c)



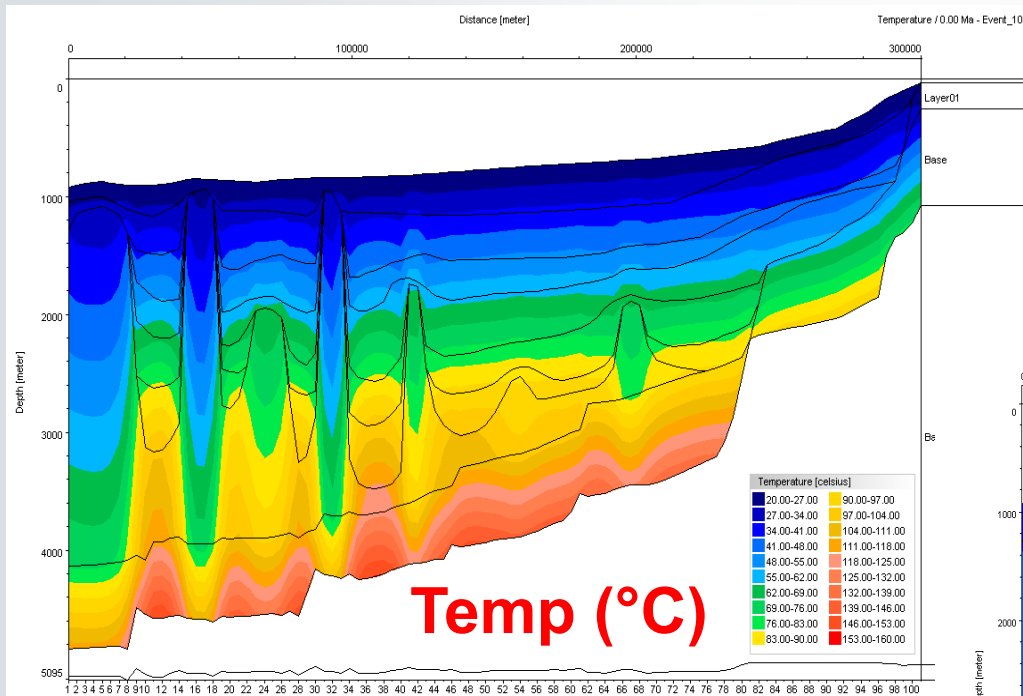
d) Heat Flow in mW/m<sup>2</sup>





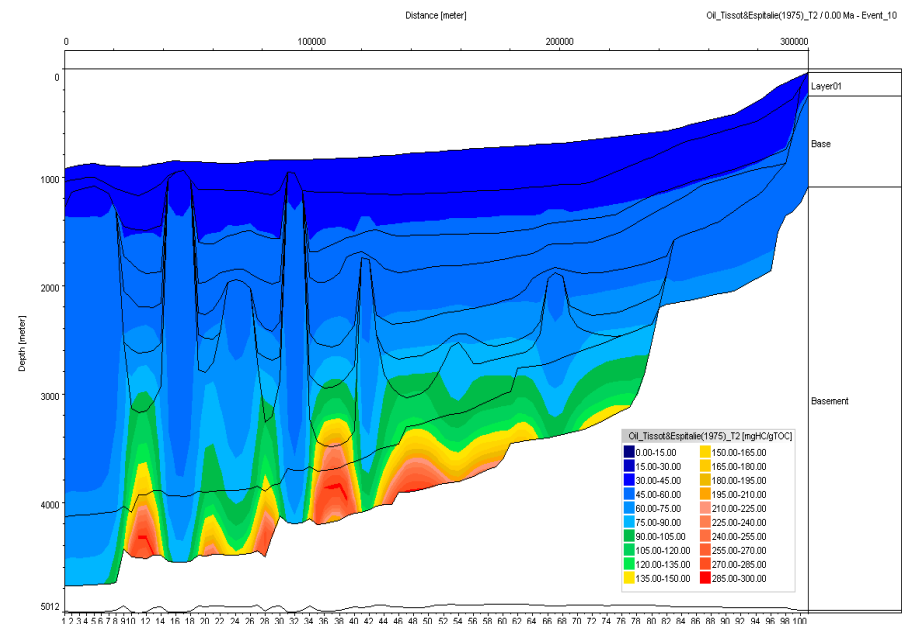
# Geothermics in Subsalt Basins (GOM)

## Heat Transfer



This example shows the strong effect of salt diapirs on temperature and maturity pattern in the subsalt system

## Maturation Oil Generation

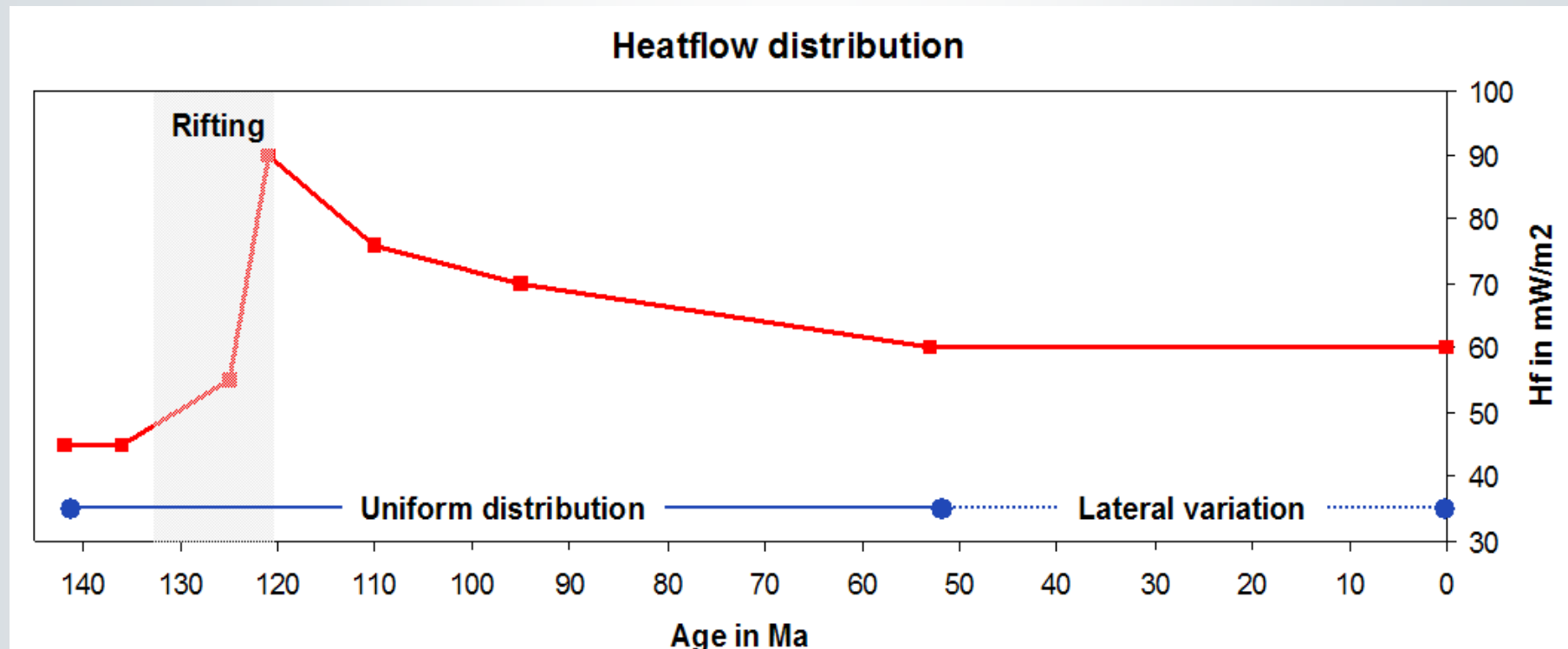


# Heat Flow History - Basin Dynamics

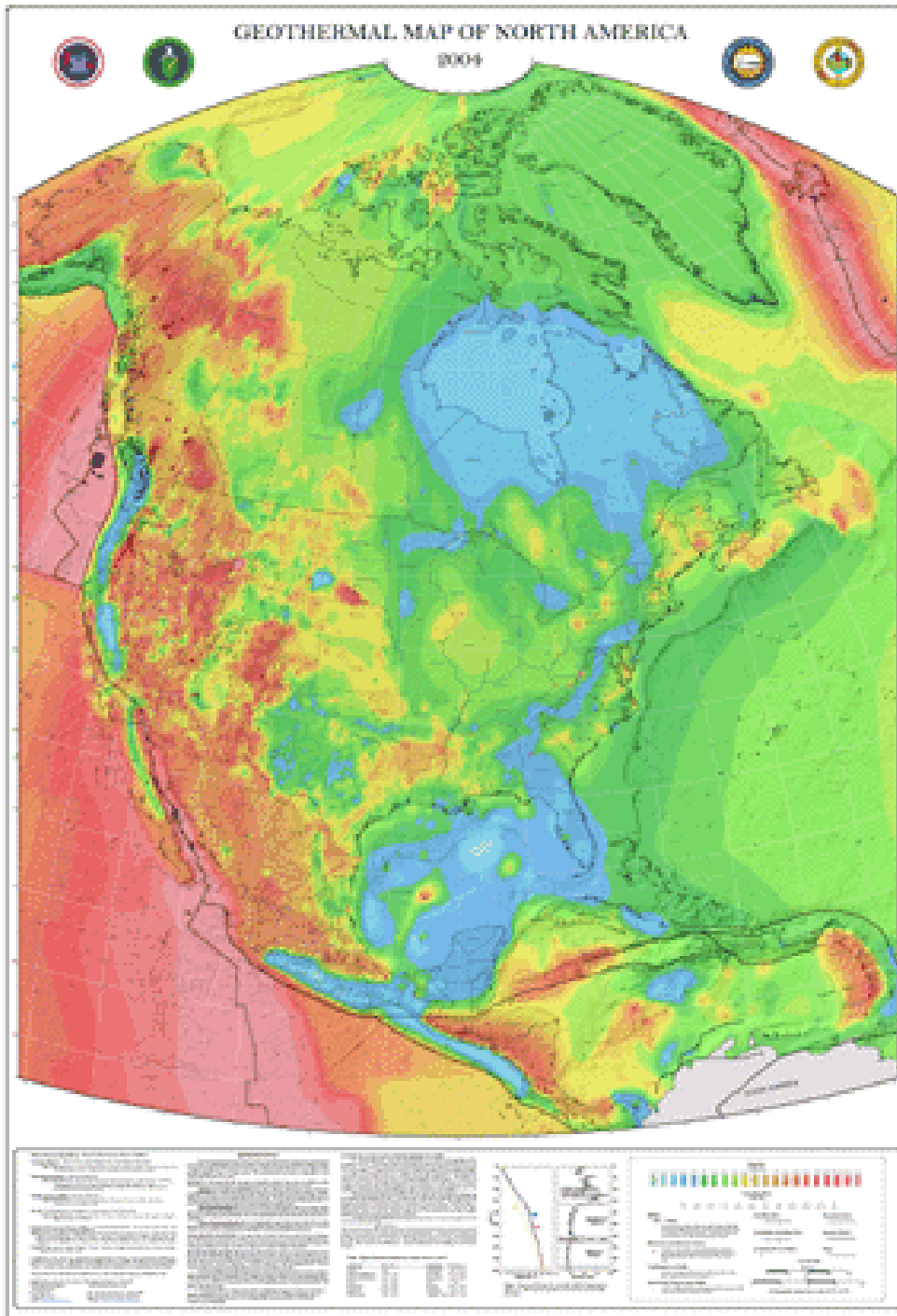
Synrift

Postrift (cooling)

Mature Passive Margin





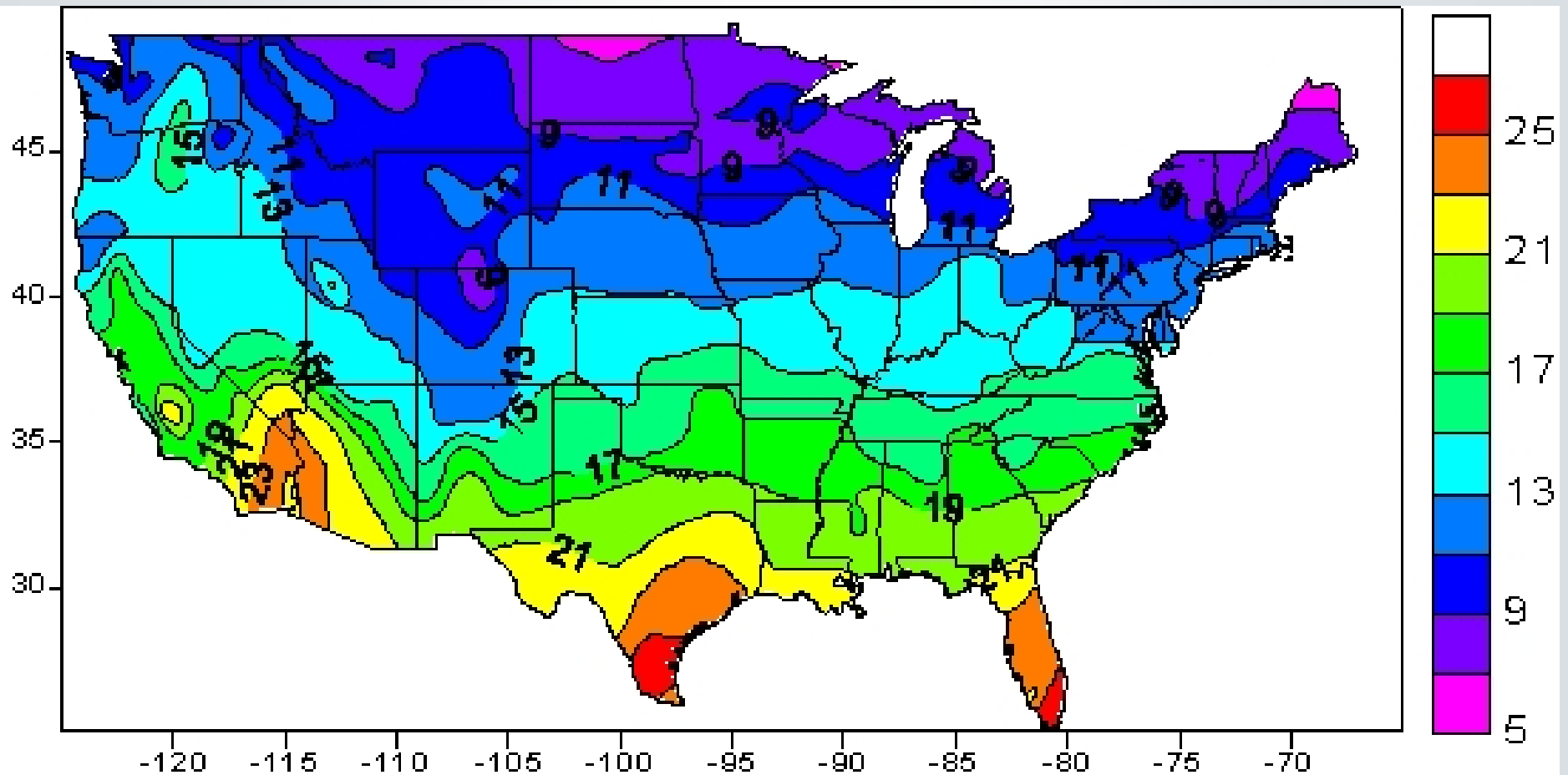


# Heat Flow Map of North America

Blackwell, D. D., and Richards, M.  
2004. Geothermal Map of North  
America. American Assoc.  
Petroleum Geologist (AAPG), 1  
sheet, scale 1:6,500,000.

Present heat flow  
pattern in respect to  
major tectonic  
features

# Průměrná povrchová teplota

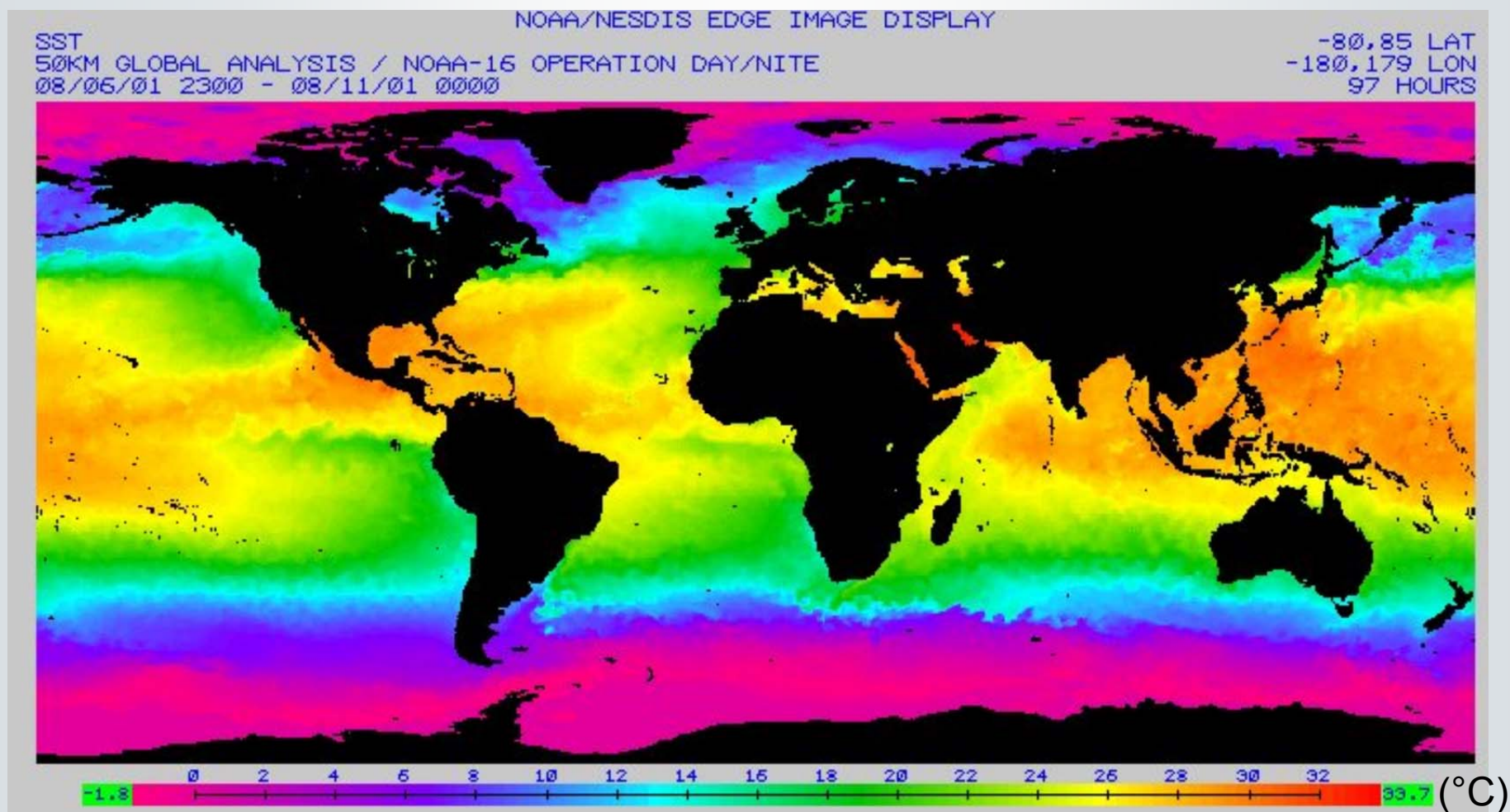


Average surface temperature (°C) of the United States from groundwater measurements.

This is a reproduction of the Map by T.E. Gass (1982) Geothermal Heat Pumps Geothermal Resources Council Bulletin 11(11), 3-8.



# Teplota hladiny oceánů



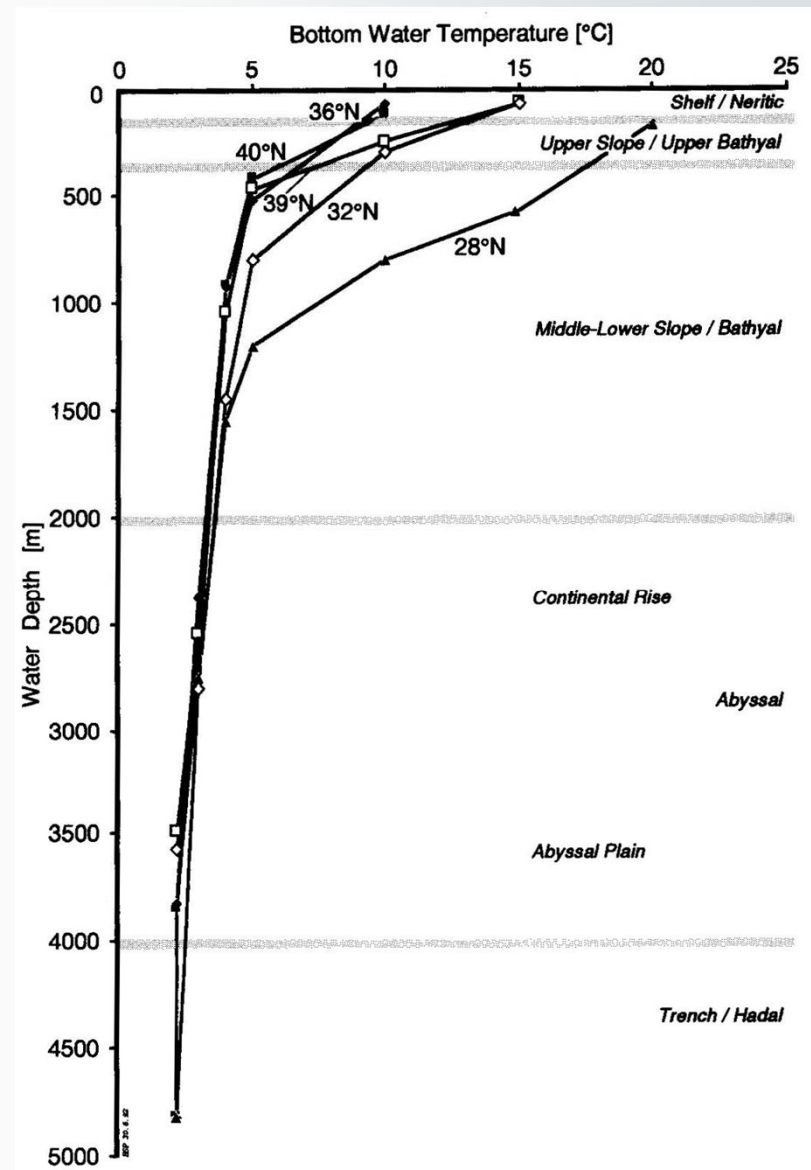
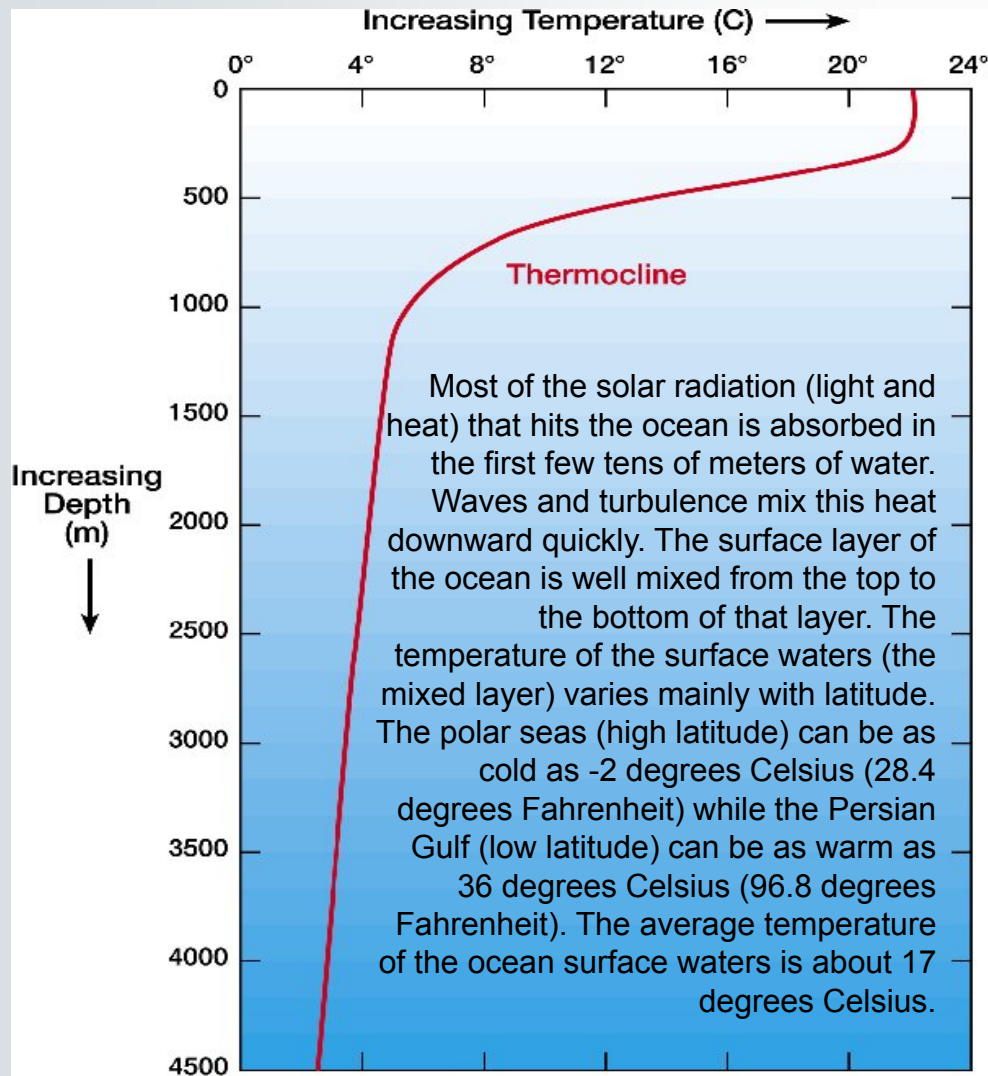
This image shows the temperature ( $^{\circ}\text{C}$ ) of the ocean water at the surface (August 6-11, 2001).

This particular data set was taken by the NOAA-16 satellite. NOAA-16 is part of the TIROS series of polar-orbiting, environmental satellites.

Image courtesy of The National Oceanic and Atmospheric Administration (NOAA)

<http://www.windows.ucar.edu/>

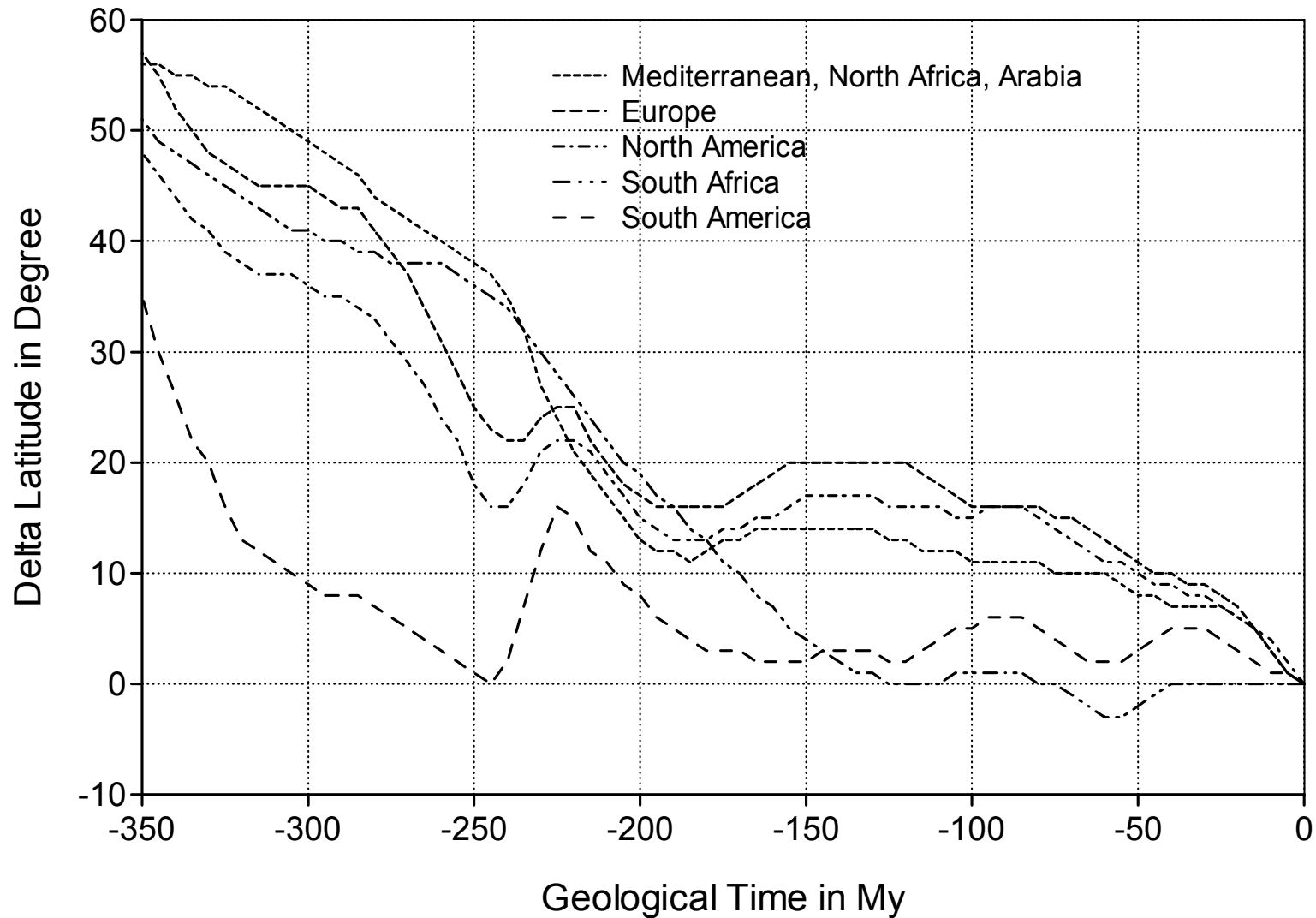
# Teplota v oceánech - hĺobkový profil vodným sloupcom



Depth profiles of bottom water temperatures for several transects in the Northwest Atlantic Ocean margin.

From: POELCHAU et al. 1997

# Correction of the Upper Boundary Conditions (Climatic Temperature) based on Paleo-Climatic Evolution and Lithospheric Plate Drifting

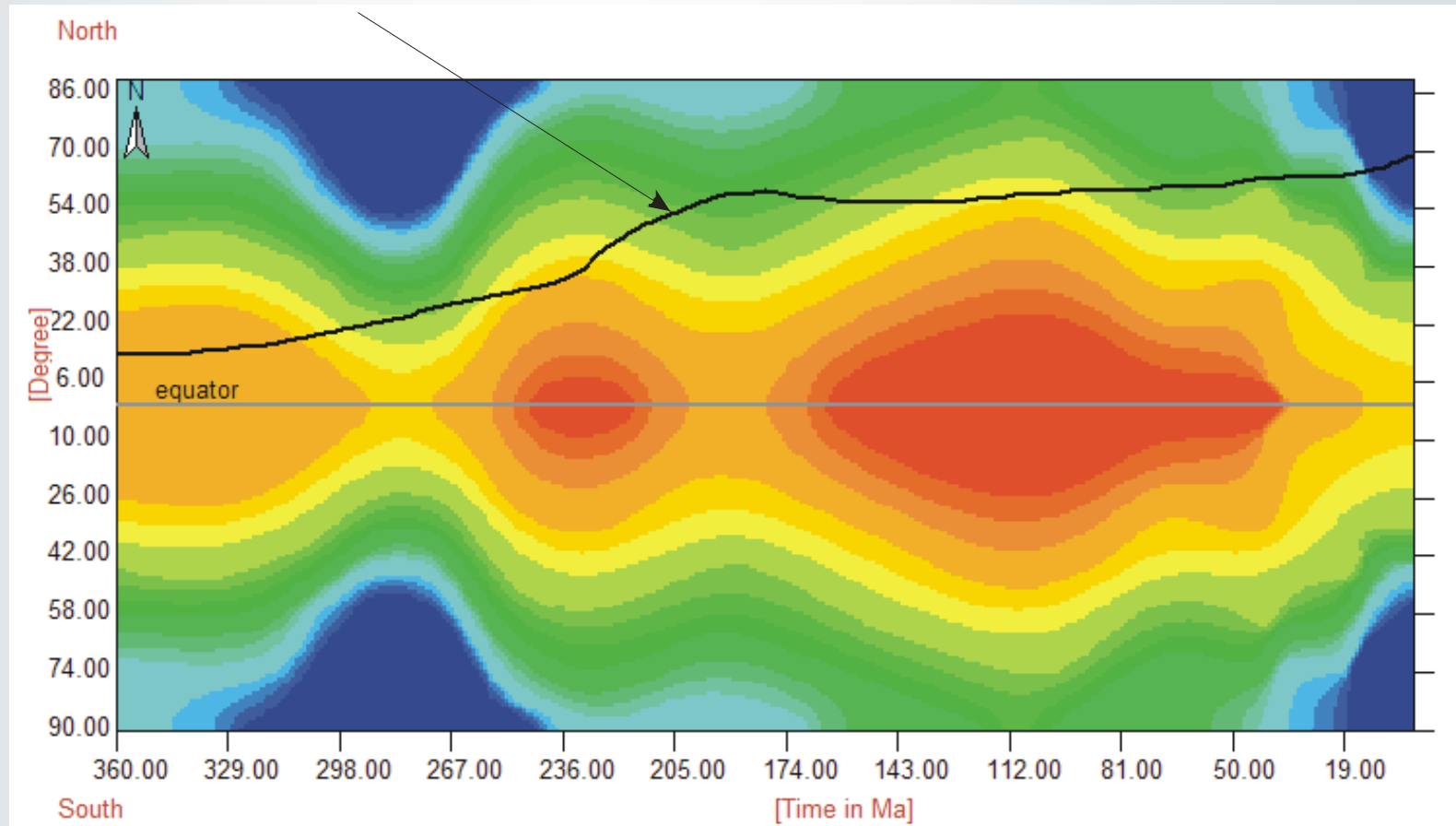
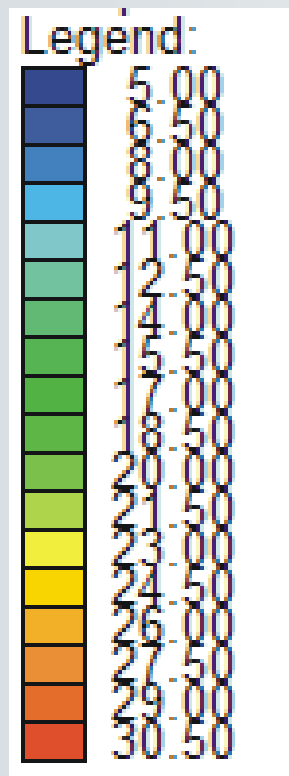




# Geologická historie povrchových teplot Země

## Rekonstrukce paleo-šířky a změny klimatu v čase

Surface temperature for Northern Europe at 70 degrees latitude



Devon

Geologický čas (Mil let před současností)

Dnes

# Geotermie - Shrnutí

- Přínos tepelné energie ze zem. hlubin je dán tepelným tokem a tepelným efektem rozpadu radioaktivních materiálů
- Teplotní profil s hloubkou  $\leq$  tepelný tok a **tepelné vodivosti**
- Všechno se mění - klima, dynamika Země