

# Biogeography. Lecture 7

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# Outline

## Most important geological periods

Mesozoic era: from Triassic to Cretaceous

Cenozoic era



# Most important geological periods

Mesozoic era: from Triassic to Cretaceous



# Mesozoic-Cenozoic extinction

Two extinctions:

- ▶ Most of large archosauromorphs, plus plesiosaurs and ichthyosaurs. Crocodiles, birds, mammals, amphibians survived.
- ▶ Shelled cephalopods (belemnites, ammonites) and many other marine groups

Plants and insects were not affected.



## The mammal hero: *Repenomamus robustus*



In 2005, Chinese paleontologists found the tricodont mammal skeleton with young dinosaur in the stomach



# Most important geological periods

## Cenozoic era



# From Paleogene to Quaternary

## Cenozoic era:

- ▶ Paleogene: starts 66 Mya

### Includes:

- ▶ Paleocene
- ▶ Eocene
- ▶ Oligocene

- ▶ Neogene: starts 23 Mya

### Includes:

- ▶ Miocene
- ▶ Pliocene

- ▶ Quaternary: starts 2.5 Mya

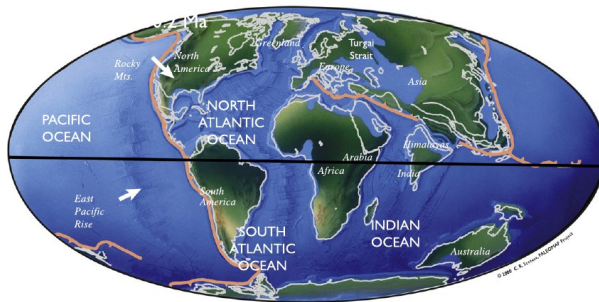
### Includes:

- ▶ Pleistocene
- ▶ Holocene



# Paleogene

50.2 Ma Paleogene

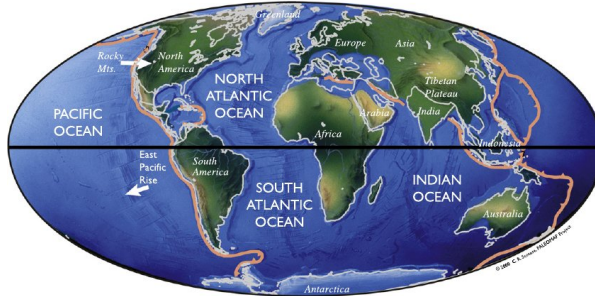


- ▶ Warm, even climate
- ▶ South America isolated, Tethys sea is slowly closing, India moves to Asia
- ▶ Mammals fill the big size class



# Neogene

14 Ma Neogene



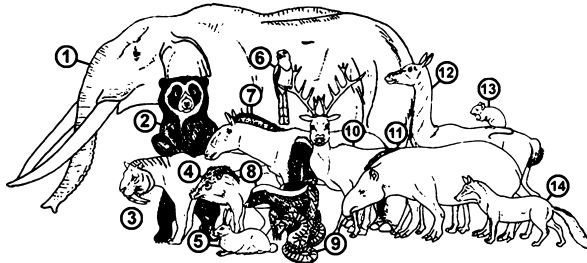
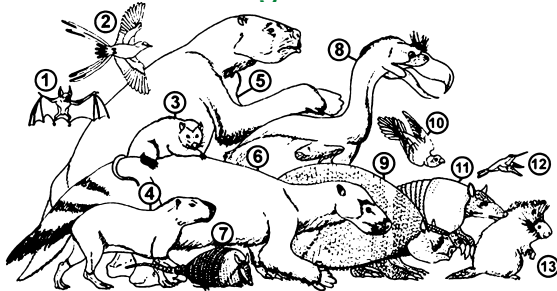
- ▶ Colder and drier
- ▶ Ice covers Antarctic, Americas united
- ▶ Grasses and hoofed mammals together form grasslands

# Great American Interchange

- ▶ Before Neogene, South America was an isolated continent like Australia now and keeps very unusual fauna
- ▶ Formation of the Isthmus of Panama led to the dramatic exchange in fauna between South and North Americas
- ▶ More advanced northern animals invaded South America but some of southern species (like armadillo, porcupines, opossums, giant sloth) became very successful on the North.



# Great American Interchange: north and south



# Quaternary

## 21000 Years Quaternary



- ▶ Great glaciation again (the last was in Carboniferous), many species escaped in refugia
- ▶ Rocky Mountains and Himalayas
- ▶ Humans

# Summary

- ▶ Impact theories are mentally attractive but do not explain slow and “blurred” extinction as well as existence of “untouchable” groups like plants and insects.
- ▶ Ecological palaeontology states that most mass extinctions were results of **biological crises**. The nature of these crises is internal.



# For Further Reading



A. Shipunov.

*Biogeography* [Electronic resource].

2014—onwards.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_330](http://ashipunov.info/shipunov/school/biol_330)



Great American Interchange.

[http://en.wikipedia.org/wiki/Great\\_American\\_  
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