

## Kenozoik PALEOGEN

### „ podjela kenozoika:

- 3. kvarter (gornji pliocen, pleistocen, holocen)
- 2. neogen (miocen, donji i srednji pliocen)
- 1. paleogen (paleocen, eocen, oligocen)

„ holocen (recentno doba) - ne zna se je li to samo jedan interglacijal unutar pleistocena ili početak novoga geološkog razdoblja

## Paleogen

### „ podjela

- . paleocen (dan, salendan, tanet): 65,5 - 56 mil. god.
- . eocen (ipres, lutet, barton, priabon): 56 - 34 mil. god.
- . oligocen (rupel, hat): 34 - 23 mil. god.

## Paleogen

- “ važniji biološki događaji
  - . d. eocen: prvi primati i trave; ubrzana diverzifikacija sisavaca
  - . sr. eocen: značajan razvoj glodavaca
  - . g. eocen: prvi slonovi
  - . na granici s neogenom nema masovnog izumiranja
- “ važniji paleogeografski događaji
  - . d. eocen: širenje oceanske kore između Grenlanda i Norveške, početak kolizije Azije i Indije
  - . g. eocen: početak zatvaranja Istočnog Tethysa

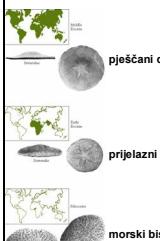
## Život u moru



Stanley, 2005, Freeman

- “ krajam krede izumri:
  - . amoniti, belemniti, rudisti, morski gmazovi
- “ obnova nakon krednog izumiranja
  - . obnovili se započeli novi razvoj: bentičke foraminifere, ježinci, briozoji, rakovi, puževi, bivalve
  - . vapnenički nanoplankton se rediverzificirao - formirao pišacu kredu samo početkom paleogena
  - . nove životinje
- “ heksakorali tek u oligocenu

## Paleogenski život



- “ pješčane obale formirale nove niše
  - . pješčani dolari (jedini ježinci koji su živjeli na pijesku) razvili se iz morskih biskvita
- “ na kopnu:
  - . sisavci zamijenili gmazove prijezajni oblik
  - . male promjene u biljnom svijetu

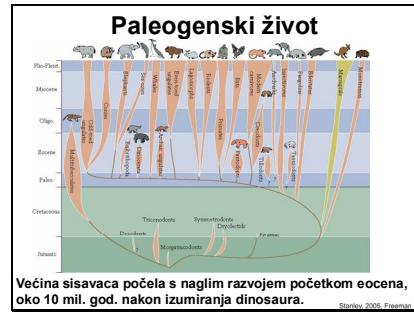
Stanley, 2005, Freeman

## Paleogenski život

“ diverzifikacija sisavaca

“ paleocenski:

- . šišmiši, kitovi, tobolčari, insektivora, primati



Većina sisavaca počela s naglim razvojem početkom eocena, oko 10 mil. god. nakon izumiranja dinosaura.

Stanley, 2005, Freeman

## Paleogenski život



“ šišmiši u paleocenu

### Paleogenski život



„ primati se razvili u paleocenu

Stanley, 2005, Freeman

---

---

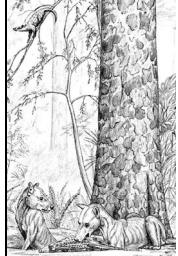
---

---

---

---

### Paleogenski život



„ sisavci mesojedi se počeli razvijati sredinom paleogena

Rekonstrukcija srednjepaleocenskog okoliša u Novom Meksiku.

Stanley, 2005, Freeman

---

---

---

---

---

---

### Paleogenski život



„ najraniji konji se pojavili koncem paleocena

*Hyracotherium*, najraniji konj.

Stanley, 2005, Freeman

---

---

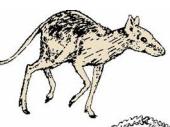
---

---

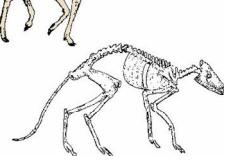
---

---

### Paleogenski život



“ vrste sisavaca  
udvostručene



“ kopitari  
· neparnih  
prstiju  
· parnih prstiju

Stanley, 2005, Freeman

---

---

---

---

---

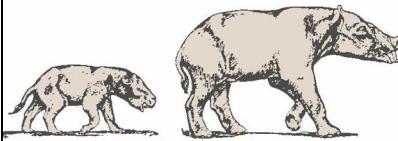
---

---

---

### Paleogenski život

“ donjoeocenski  
slonovi  
· *Moerithium*



Stanley, 2005, Freeman

---

---

---

---

---

---

---

---

### Paleogenski život



“ mesonhidi

“ krodonti

“ *dijatrimaji*

Stanley, 2005, Freeman

---

---

---

---

---

---

---

---

### Paleogenski život



„ nekoliko  
ptica  
koje su  
mogle  
letjeti

Stanley, 2005, Freeman

---

---

---

---

---

---

---

---

### Paleogenski život



„ oligocenski  
sisavci

- konji nestali u Euroaziji u eocenu
- nove vrste konja u Sj. Americi

Stanley, 2005, Freeman

---

---

---

---

---

---

---

---

### Paleogenski život



„ mesojedi se  
razvili u  
eocenu

Stanley, 2005, Freeman

---

---

---

---

---

---

---

---

### Paleogenski život



“ primati napredovali u oligocenu



“ *egyptopithecus*

Stanley, 2005, Freeman

---

---

---

---

---

---

---

---

### Paleogenski život

“ gmazovi i vodozemci rijetki  
.. raniče (prave žabe)

“ insekti slični današnjima

---

---

---

---

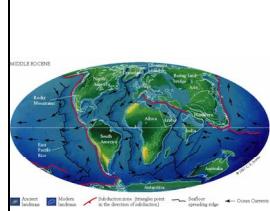
---

---

---

---

### Paleogeografija



“ kontinenti bili u današnjoj konfiguraciji ali bliži jedni drugima  
“ donji paleogen  
.. naglo topla klime  
“ u eocenu hladnije iako počinje toplim pulsom

Stanley, 2005, Freeman

---

---

---

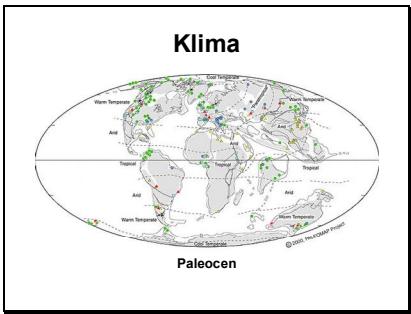
---

---

---

---

---



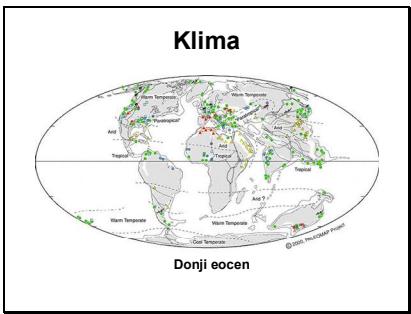
---

---

---

---

---



---

---

---

---

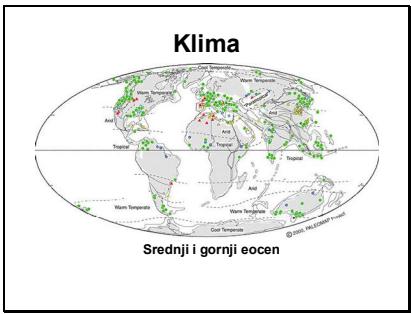
---

---

---

---

---



---

---

---

---

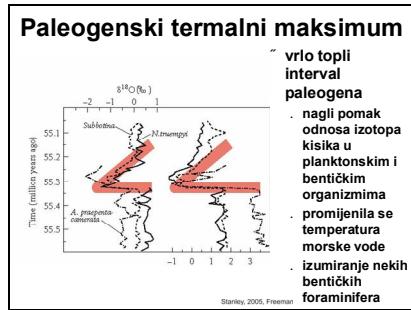
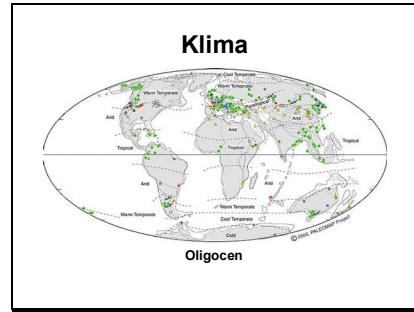
---

---

---

---

---



---

---

---

---

---

---

---

---

---

---



---

---

---

---

---

---

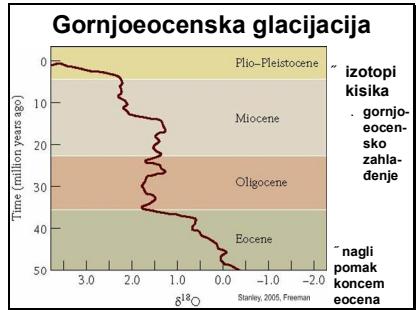
---

---

---

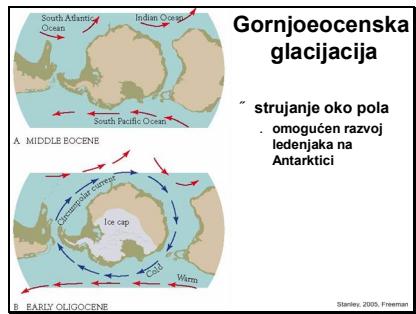
---

---



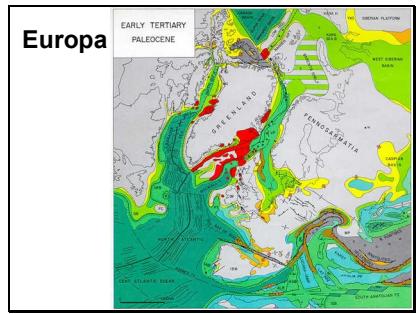
topi  
ka  
ornjo-  
ocen-  
ko  
ahla-  
enje

i  
k  
em  
a



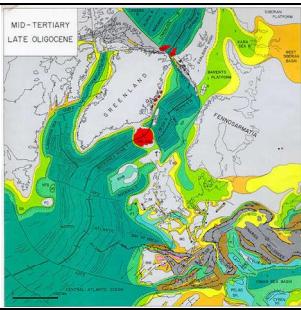
# Gornjoeocenska glacijacija

- „strujanje oko pola
  - . omogućen razvoj ledenjaka na Antarktici



Europa

## Europa



## Hrvatska

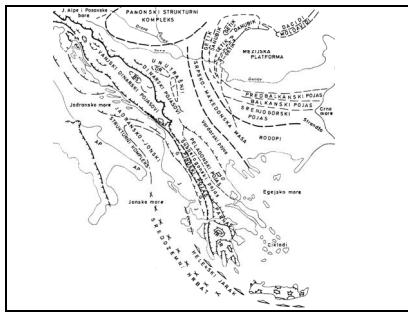
### "Dinaridi

- . Iaramijska faza
  - " destrukcija karbonatne platforme
  - " izdizanje Dinarida
  - " emerzija - boksiti

## Hrvatska

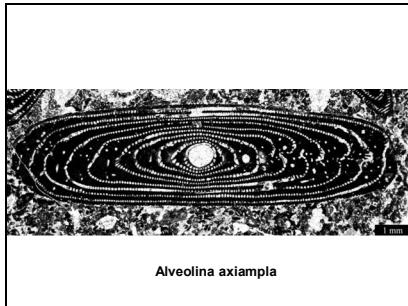
### " paleocen

- . Dinaridi: *Vanjski Dinaridi*  
*Unutarnji Dinaridi*
- . središnja Dalmacija: foraminiferski  
vapnenci
- . Istra: breče, slatkovodni i brakični  
vapnenci
  - " Kozinske naslage ili Liburnijska formacija



### Hrvatska

- “ donji - srednji eocen
  - . foraminiferski vapnenci
- “ srednji eocen
  - . lapor s rakovicama
- “ taloženje turbiditnih naslaga (“fliš”)
  - . dijakrono
    - “ sj. Istra: donji-srednji eocen
    - “ središnja Dalmacija: gornji oligocen - donji miocen



*Alveolina axiampla*

## Hrvatska

### " Prominske naslage

- . eocen - oligocen
- . konglomerati, kalkareniti, turbiditi, vapnenci, lapori, ugljen - "molasa"
- . Jelarske breče
- " oligocen: početak formiranja slatkovodnih bazena u Dinaridima

---

---

---

---

---

---

---

---

## Hrvatska

### " središnja Hrvatska (i sjeverna Bosna)

- . kompresijske tektonika
- . paleocen - eocen: taloženje fliša na sjevernom rubu Dinarida, a zatim vapnenci
- . gornji eocen - oligocen: pirinejska faza

---

---

---

---

---

---

---

---

## Hrvatska

### " sjeverozapadna Hrvatska

- . početak eocena: prestanak taloženja fliša i izdizanje blokova na površinu
- . srednji eocen: marinska transgresija
- . oligocen: lapori

---

---

---

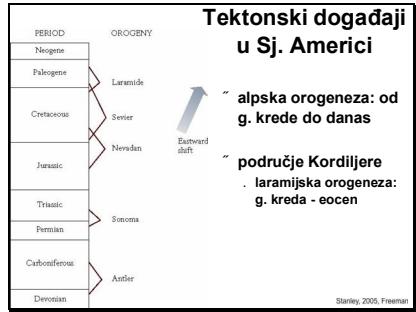
---

---

---

---

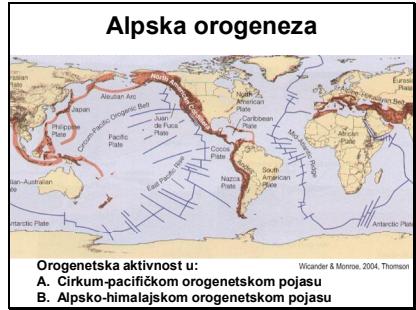
---



## Tektonski događaji u Sj. Americi

## **alpska orogeneza: od g. krede do danas**

## područje Kordiljere



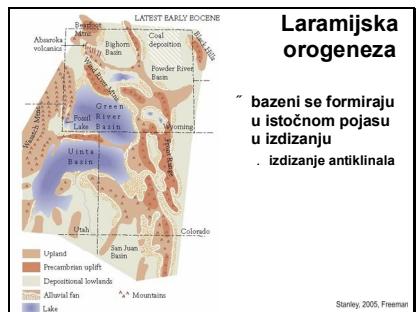
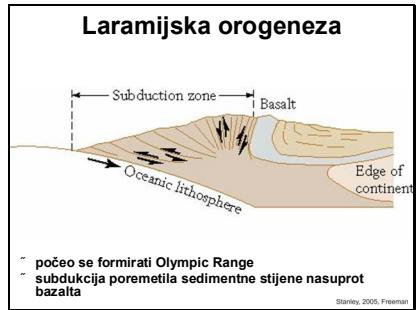
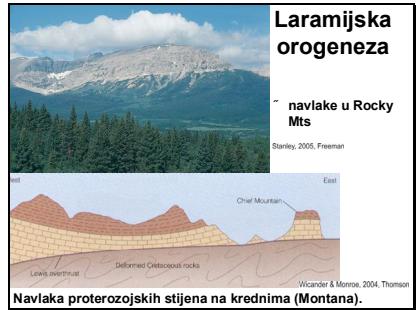
## **Alpska orogeneza**

**Orogenetska aktivnost u:**

- A. Cirkum-paciifičkom orogenetskom pojusu
- B. Alpsko-himalajskom orogenetskom pojusu

## Laramijska orogeneza

- “ intenzivna  
magmatska  
aktivnost
- “ sj. i j. segment su  
težko prepoznati



---

---

---

---

---

---

---

---

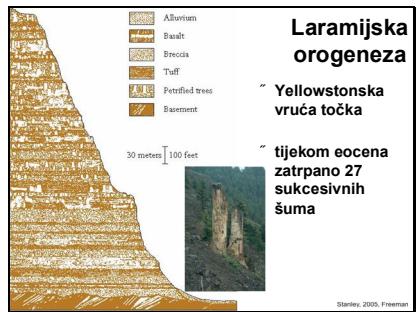
---



## Laramijska orogeneza

- “ fronta Rocky Mts
- “ erozija  
izjednačena s  
izdizanjem

Stanley, 2005, Freeman

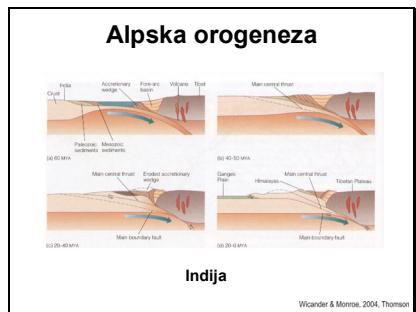


Laramijska  
orogeneza

"Yellowstonska  
vruća točka

"tijekom eocena zatrpano 27 sukcesivnih šuma

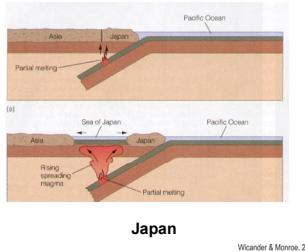
Stanley, 2005, Freeman



## **Alpska orogeneza**

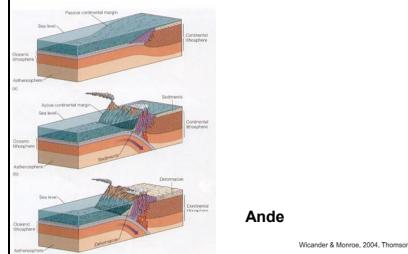
Wicander & Monroe, 2004, Thomson

### Alpska orogeneza



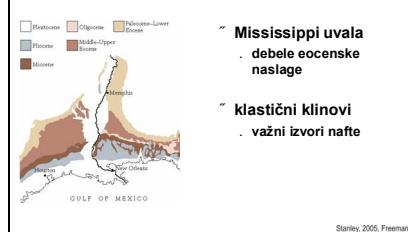
Wicander & Monroe, 2004, Thomson

### Alpska orogeneza



Wicander & Monroe, 2004, Thomson

### Meksički zaljev





## **Chesapeake zaljev**



„najveći estuarij u svijetu

"kršje nađeno ispod fosila starih 36 mil. god.

## "impakt krater

Stanley, 2005, Freeman

The figure is a map of the Chesapeake Bay area. It shows the bay's coastline and various rivers flowing into it. A specific location on the western shore is highlighted with a yellow circle and labeled 'Impact'. To the west of this circle, a green shaded area represents the 'Baltimore District of Columbia' region. A dashed blue line extends from the impact point towards the east, labeled 'Tidal wave boundary' and 'Meteoric impact front'. Another dashed blue line further east is labeled 'Meteoric impact front'. A red star marks the 'Toms Canyon crater'. The map also includes labels for 'Smithfield River', 'Phila delph', 'Toms Creek', and 'Toms Creek'. A small number '8' is located at the bottom left corner.

# Chesapeake zaljev

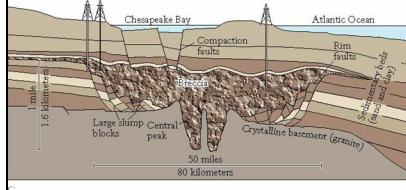
- “ Toms Canyon
  - . slične strukture kao i Chasepeake zaliv

**Zaključak:**

- . serije meteorita pogodile ovo područje

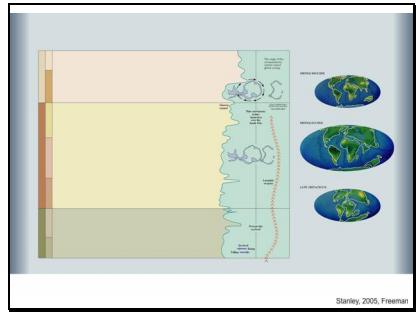
The figure is a geological cross-section of the Chesapeake Bay area. It shows a large, roughly circular depression at the bottom, labeled 'Crater' with a dashed line through its center. Above the crater, a vertical column of rock layers is labeled 'Compaction faults'. To the left, several vertical columns of rock layers are labeled 'Large slump blocks'. A central peak is labeled 'Central peak'. The surrounding land is labeled 'Brazos'. The top layer of the diagram is labeled 'Sedimentary rocks'. The ocean to the east is labeled 'Atlantic Ocean'. The top of the diagram is labeled 'Chesapeake Bay'. A scale bar at the bottom indicates '80 kilometers' horizontally and '1 mile' vertically. A north arrow is also present.

## **Chesapeake zaljev**

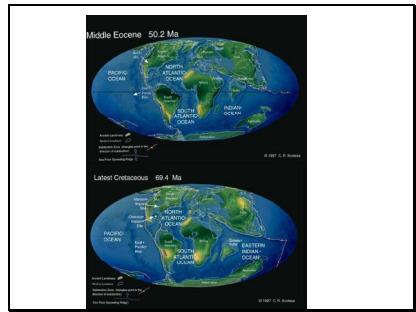


"sezmički profil pokazuje krater i punjenje bazena brećom

Stanley 2005, Freeman

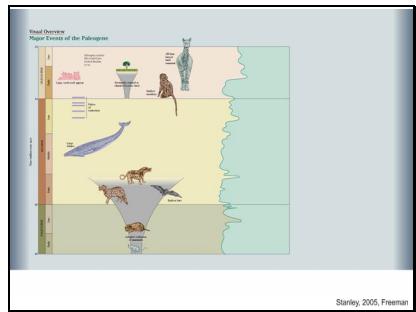


Stanley, 2005, Freeman



This map illustrates the global distribution of continents and oceans approximately 69.4 million years ago, during the Latest Cretaceous. The map shows the following features:

- PACIFIC OCEAN**: Labeled on the left side.
- ATLANTIC OCEAN**: Labeled at the top center, divided into the **NORTH ATLANTIC OCEAN** and **SOUTH ATLANTIC OCEAN**.
- INDIAN OCEAN**: Labeled on the right side.
- ANTARCTIC CONTINENT**: Shown at the bottom, surrounded by the South Atlantic and Indian Oceans.
- ASIA**, **AUSTRALIA**, and **ANTARCTICA**: Shown as separate landmasses.
- AFRICA** and **EUROPE**: Shown joined together.
- AMERICA** (labeled as **North America** and **South America**) shown joined together.
- MAGELLANIC CONVERGENCE**: Indicated by a dashed line near the southern tip of South America.
- WORLD LATITUDES**: Shown as horizontal lines across the map.
- WORLD LONGITUDES**: Shown as vertical lines across the map.
- MAP SOURCE: G. P. VANDERKAM, 1990**



Stanley, 2005, Freeman