

## Mezozoik KREDA

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### Kreda

" podjela:

- . donja kreda (berijas, valendis, otriv, barem, apt, alb): 145 - 100 mil. god.
- . gornja kreda (cenoman, turon, konijak, santon, kampan, mastricht): 100 - 65,5 mil. god.
  - " ranije: cenoman, turon i senon
  - . senon: konijak, santon, kampan, mastricht

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### Kreda

" važniji biološki događaji

- . donja kreda - prvi placentalni sisavci, prve cvjetne biljke (kritosjemenjače), prve diatomeje
- . konac krede - potpuno izumiranje dinosaura, amonita, belemnita, inoceramusa, rudista, globotrunkana

Kreda

- važniji paleogeografski događaji
    - . donja kreda - širenje oceana između Indije i Australsko-antarktičkog kopna
    - . gornja kreda - početak dezintegracije Australsko-antarktičkog kopna, širenje oceana između Australije i Antarktike, ubrzano kretanje Indije prema sjeveru

- Peter Skelton: The Cretaceous World.*  
Cambridge University Press. 2003.,  
ISBN 0 521 53843 2

Život u kredi



- plankton
    - radijacija diatomeja
    - diverzifikacija foraminifera
    - radijacija vapnenačkog nanoplanktona

Stanley, 2005, Freeman

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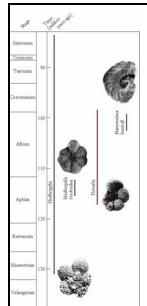
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Kreda



- "planktonske  
foraminifere s velikim  
značajem u  
biostratigrafiji

Stanley, 2005, Freeman

### Život u kredi



- ~ teleostei ribe
- . potpuno okoštale
- . simetričan rep
- . kratka čeljust

Stanley, 2005, Freeman

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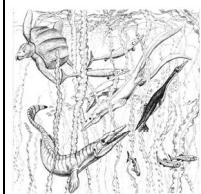
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### Život u kredi



- ~ morski gmazovi i dalje važni
- ~ glavni morski mesojedi
- . *mosasaur*
- . *hesperornis*
- . morska kornjača

Stanley, 2005, Freeman

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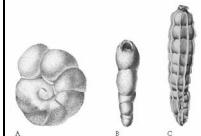
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### Život u kredi



- ~ bentos
- . foraminifere
- . briozoji enkrustiraju morsko dno (danas i dno brodova) u prevlakama
- . bivalve mekušci-bušači
- . puževi
- . rakovi

Stanley, 2005, Freeman

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Stanley, 2005, Freeman



Stanley, 2005, Freeman

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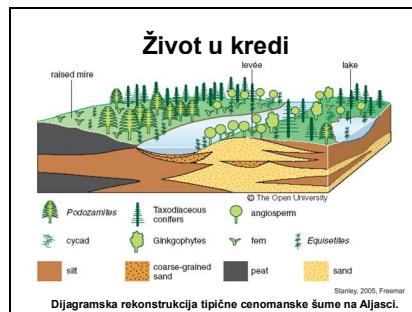
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Dijagramska rekonstrukcija tipične cenomanske šume na Aljasci.

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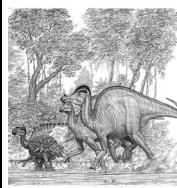
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## Život u kredi



### “kralježnaci

- gornjokredni kralježnaci
- bolje poznati
- dinosauri s "pačjim klijunom"
- umjesto nosoroga - rogati dinosauri

Stanley, 2005, Freeman

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## Život u kredi



Figure 17-9  
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Inc., publishing as Pearson Addison Wesley.  
All rights reserved.

Skrb za mladunčad.

Stanley, 2005, Freeman

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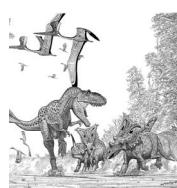
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## Život u kredi



- *Tyrannosaurus rex*
- kopneni krokodili
- leteći kralježnaci
  - gmazovi
  - ptice

Stanley, 2005, Freeman

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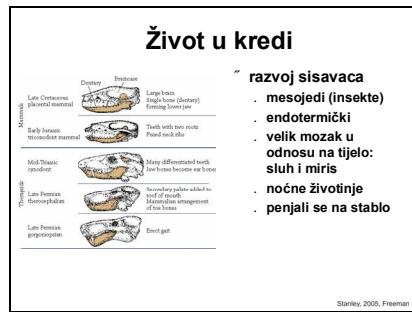
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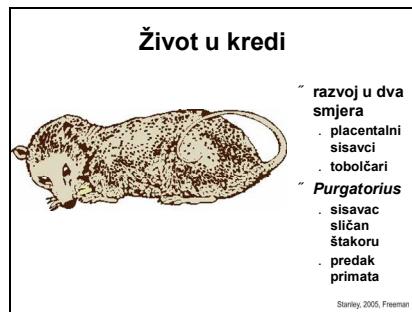
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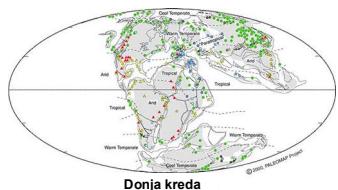
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Klima



## Donja kreda

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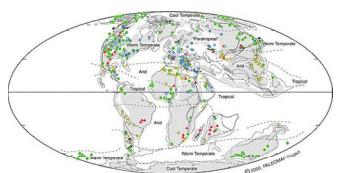
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Klima



## Gornja kreda

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## Paleogeografija

- kredne stijene pretrpjele manje metamorfizma u erozije nego starje stijene
  - dokumentirani kopneni, plitkomorski i dubokomorski sedimenti
  - u d. kredi Gondvana gotovo jedinstvena, u g. kredi J. Amerika, Afrika i Indija samostalni kontinenti
  - u g. kredi većina kontinenata izolirana
  - d. kredno razmazanje kontinenata uzrokovalo širenje mora



Stanley, 2005, Freeman

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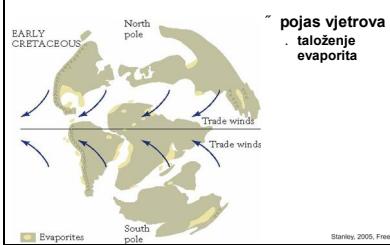
## Paleogeografija

- " Grenland se odvojio od Sj. Amerike
- " sredinom krede visoka razina mora



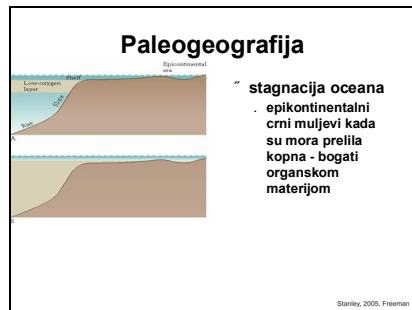
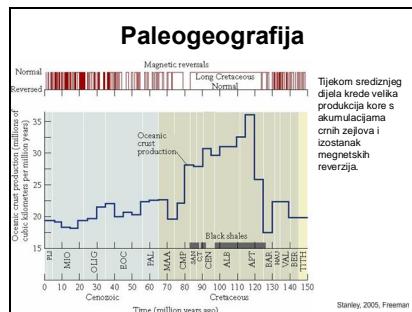
Stanley, 2005, Freeman

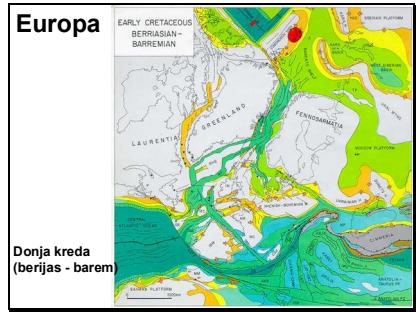
## Paleogeografija



## Paleogeografija

- " razdoblje visoke razine mora
- . početak porasta u d. kredi
- . sredinom krede najviša razina u cijelom fanerozoiku
- . dugo razdoblje bez reverznog magnetskog pola





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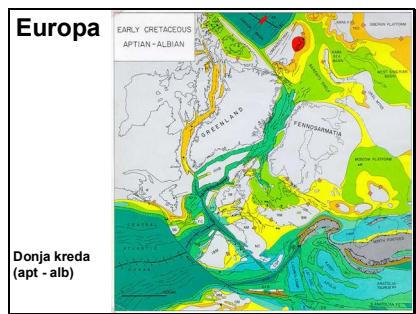
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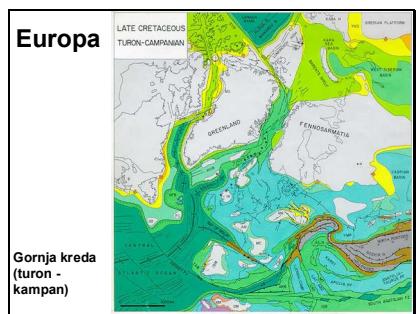
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## Europa

### “ subdukcijske zone

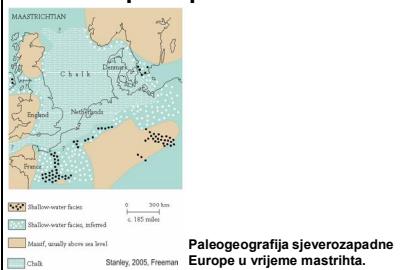
- . Zapadne Alpe
  - “ pelagička sedimentacija i fliš
  - “ urgonski facijes: rudisti vapnenac
- . Sjeverne Alpe
  - “ klastična sedimentacija prevladava nad karbonatnom (fliš)
  - “ gozavske naslage

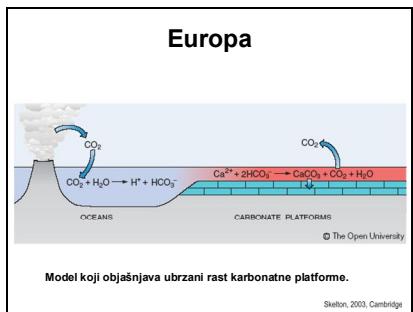
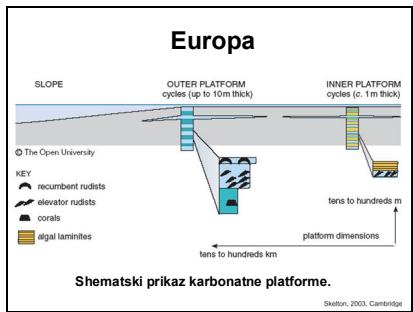
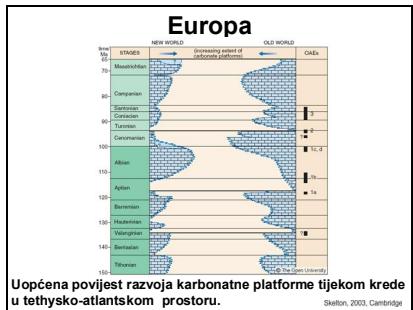
## Europska pisaća kreda

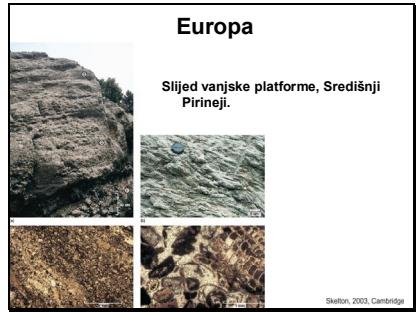
### “ gornja kreda

- . preplovljivanje zapadne Europe, bez značajne tektonike
- . velike akumulacije čistog  $\text{CaCO}_3$
- . skeletalni frgmenti, 75% od vapnenačkog nanoplanktona

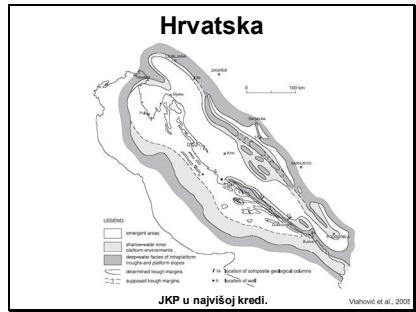
## Europska pisaća kreda







Skelton, 2003, Cambridge



Vlahović et al., 2005

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Hrvatska

- „Jadranska karbonatna platforma“
  - donja kreda
    - plitkovodni vapnenci, emerzije (tektonika)
    - tragovi stopala i kosti dinosaura
    - d. apt: djelomično potapanje platforme
    - g. apt: regionalna emerzija

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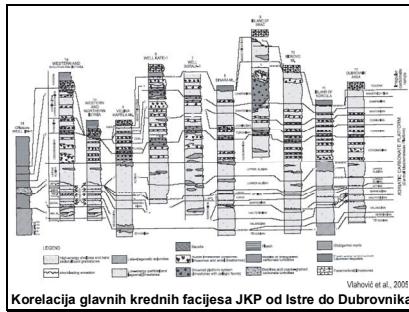
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## Hrvatska

### . gornja kređa

- “ zrela platforma, početak dezintegracije
- “ cenoman/turon - produbljavanje, ali SZ i SI dijelovi u emerziji (boksi)
- “ dezintegracija
- “ otisci stopala dinosaуra sve do maastrichta

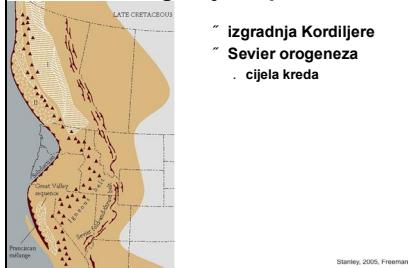


## Hrvatska

### “ Sj. Hrvatska

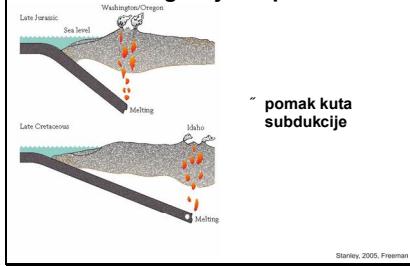
- . donja kređa
  - “ oceanska subdukcija (obdukcija)
  - “ dubokovodna sedimentacija
  - “ izdizanje
- . gornja kređa
  - “ riječna, plitkovodna marinska, dubljevodna sedimentacija (Scaglia)
  - “ magmatizam
  - “ konac kređe: dubljevodni klastiti s prijelazom u paleocen
  - “ izdizanje: laramijska faza alpske orogeneze
- . Moslavacka gora
  - “ metamorfiti

Tektonski događaji - zapadne SAD



- “ izgradnja Kordiljere
  - “ Sevier orogeneza  
cijela kreda

## Tektonski događaji - zapadne SAD



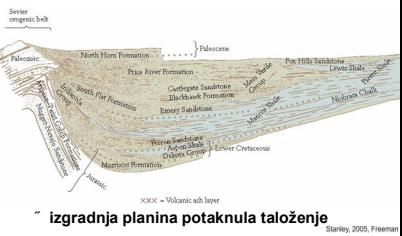
- "pomak kuta  
subdukcije

## Tektonski događaji - zapadne SAD

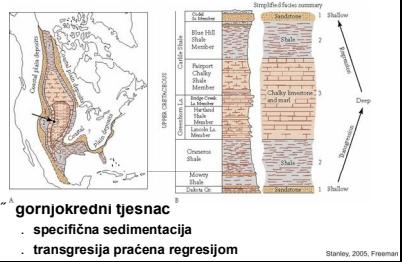


- Mowry more
    - koncem d. krede arktičke vode se proširile prema jugu i preplavile velike površine Sj. Amerike
    - do gornje krede produžili se do Meksičkog zaljeva

### Tektonski događaji - zapadne SAD

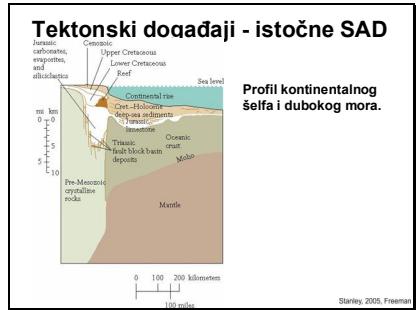


### Tektonski događaji - zapadne SAD



### Tektonski događaji - istočne SAD

- " formiranje kontinentalnog šelfa
- . sedimenti akumulirani u riftnim bazenima



## Profil kontinentalnog šelfa i dubokog mora.

Stanley, 2005, Freeman

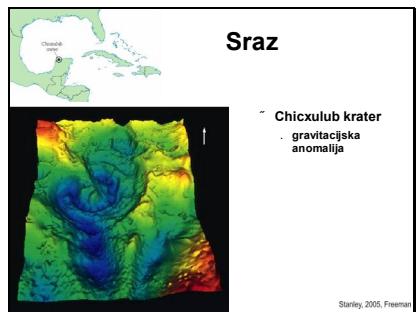


Sraz

„ sraz = impakt  
„ mikrosferule

#### **Mikrosferule iz gline s anomalijom iridija.**

Stanley, 2005, Freeman



Sraz

## **Chicxulub krater**

Stanley 2005 Freeman

Sraz



Fragmenti dolomita sa strijama izbačeni eksplozijom prilikom sraza.

Sraz

” Što je sve mogao učiniti sraz Zemlje i asteroida promjera 10 km:

- ## **neprekidna noć**

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Sraz

- grijanje iz padajuće prašine
  - zatopljenje iz zakašnjelog efekta staklenika iz aerosola

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### Sraz

- . naglo zagrijavanje zbog efekta staklenika uslijed oslobađanja CO<sub>2</sub> iz vapnenačkih naslaga

- . kisele kiše

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### Sraz

- . požari
- . snažan zvuk
- . potresi
- . tsunami

Si Brazil:  
paleocenska  
breča na  
mastihtskom  
piltkovodnom  
pješčenjaku.



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### Kredno masovno izumiranje

" vrlo naglo

- . dinosauri
- . amoniti
- . mosasauri i drugi morski gmazovi
- . redukcija kritosjemenjača i golosjemenjača
- . 90% vapnenačkog nanoplanktona i foraminifera izumrio
- . mnogobrojni mekušci (rudisti)

" sraz

- . anomalija iridija - visoka koncentracija iridija na granici kreda/paleogen
- . međutim, ima pojava i postupnog izumiranja dinosaura neki izumrli i prije impakta

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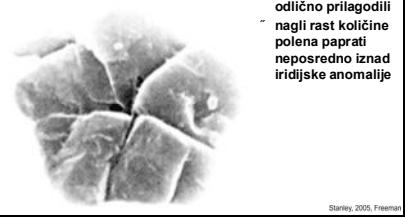
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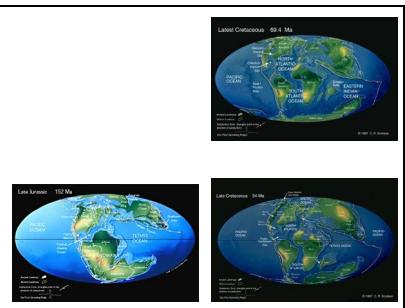
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## Kredno masovno izumiranje



- “ neki organizmi se odlično prilagodili
  - “ nagli rast količine polena paprati neposredno iznad iridijske anomalije

Stanley, 2005, Freeman



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### **Mineralne sirovine**

- fosforit: europska Rusija, Sj. Amerika
  - nafta: Kanada, Sj. Amerika, Meksiko, Bliski Istok
  - ugljen: Mongolija, Kordiljera
  - dijamanti: J. Afrika
  - zlato: Sj. Amerika
  - Hrvatska: ukrasni i građevni kamen

