

Sekvenca - značilno ponavljanje genetsko vezane skupine plasti.

Sekvenca - ponavljajoča skupina plasti debelin mm, cm, dm in m

Ciklotema - ponavljajoča skupina plasti debelin več 10 m

sekvenca - plasti se ponavljajo v zaporedju A-B-C-D, A-B-C-D,....

ciklusi - plasti se ponavljajo v zaporedju A-B-C-B-A (ciklično ponavljanje)

Ritmiti - kamnine v katerih se ponavljajo zelo tanke plasti (cm) ali lamine (ritmično ponavljanje).

Sekvence - največkrat omejene z erozijskimi površinami.

Sedimentacija je bila prekinjena, erozija je del podlage odnesla.

Hitri-postopni prehodi - ni prekinitev:

droben konglomerat ->prodnat peščenjak ->peščenjak ->
->meljasti peščenjak ->meljevec ->hitro naraščanje toka->
-> droben konglomerat ->....

Droben konglomerat - korelacijska kontinuiteta

pojemaajoče sekvenca - zrnastost se navzgor manjša (fining upward)
zmanjševanje energije ali retrogradacijska sekvenca (transgresija)

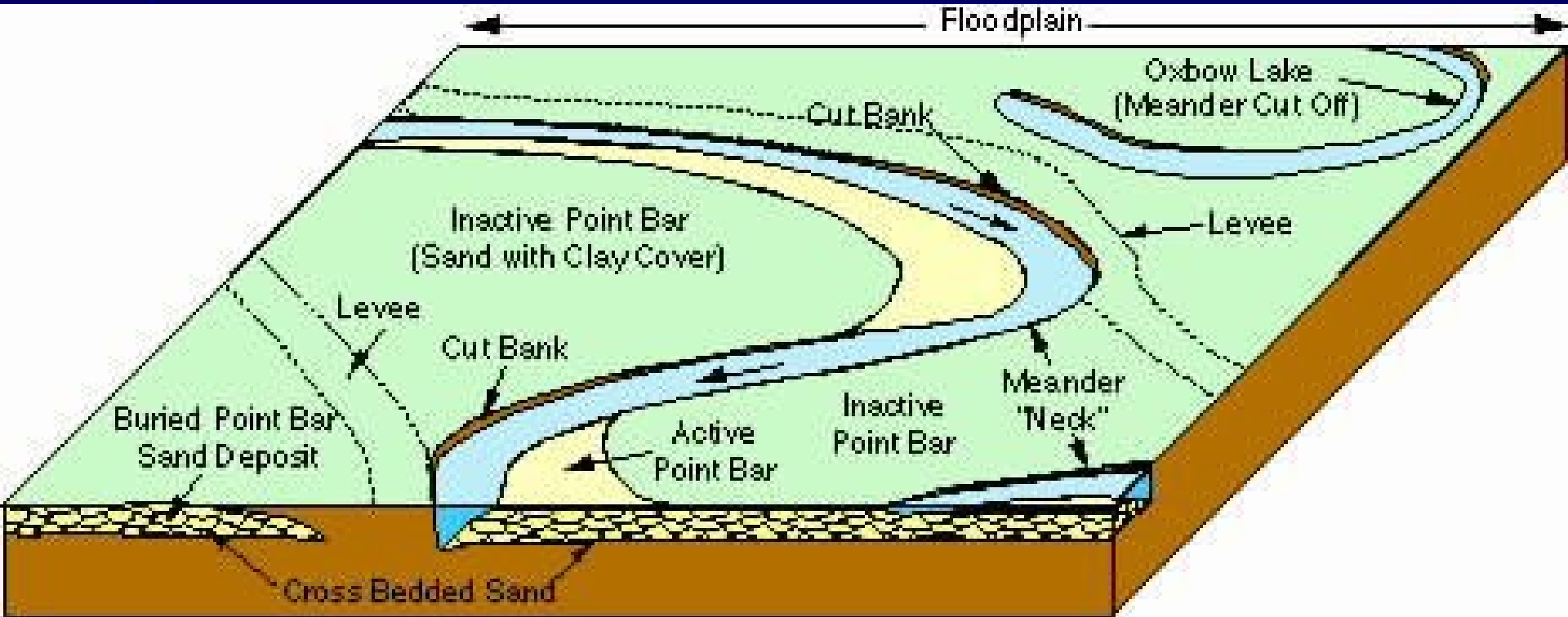
naraščajoča sekvenca - zrnastost se navzgor večja
večanje energije ali progradacijska sekvenca (regresija).

Formacija - večja geološka enota (ni vezana na geološki čas),
ki ima skupno genetsko osnovo in zato podobno materialno sestavo.

Je kompleks kamnin z enotnimi sedimentološkimi karakteristikami,
ki so rezultat enotnega sedimentacijskega prostora v določenem
geološkem obdobju.

REČNA OKOLJA

MEANDRIRAJOČE REKE



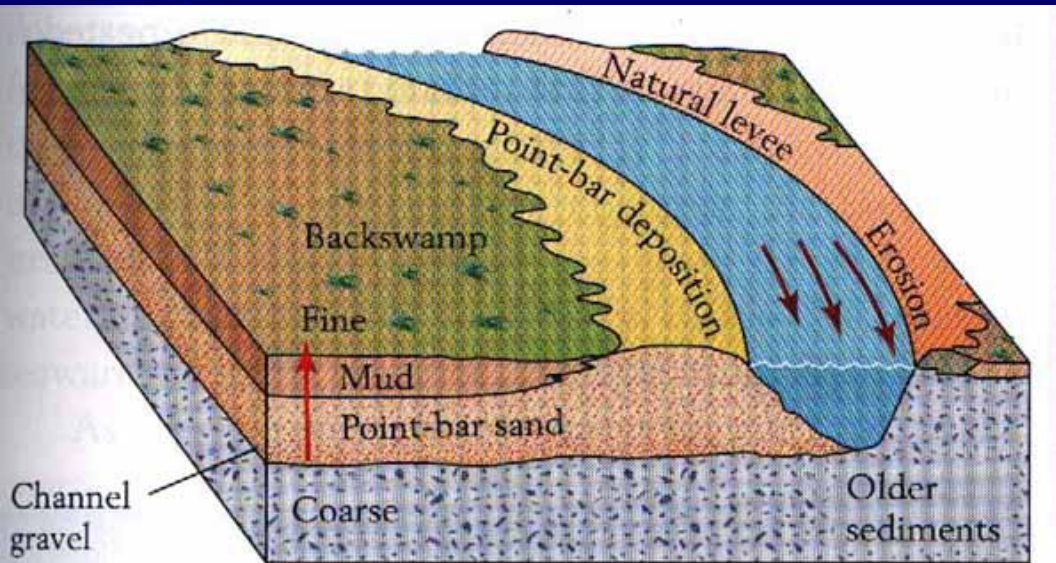
- korita nestabilna do stabilna
- transport mešan (po dnu, v suspenziji)
- sistem stabilen
- občasni preboji in opuščeni kanali
- avulzija - preboj brežine v novo korito
- poraščene peščene naplavne ravnice

Podokolja

- korito (aktivno)
- aluvialne naplavne ravnice
- prebojni vršaji
- talveg

REČNA OKOLJA

MEANDRIRAJOČE REKE



CHANNEL MIGRATION

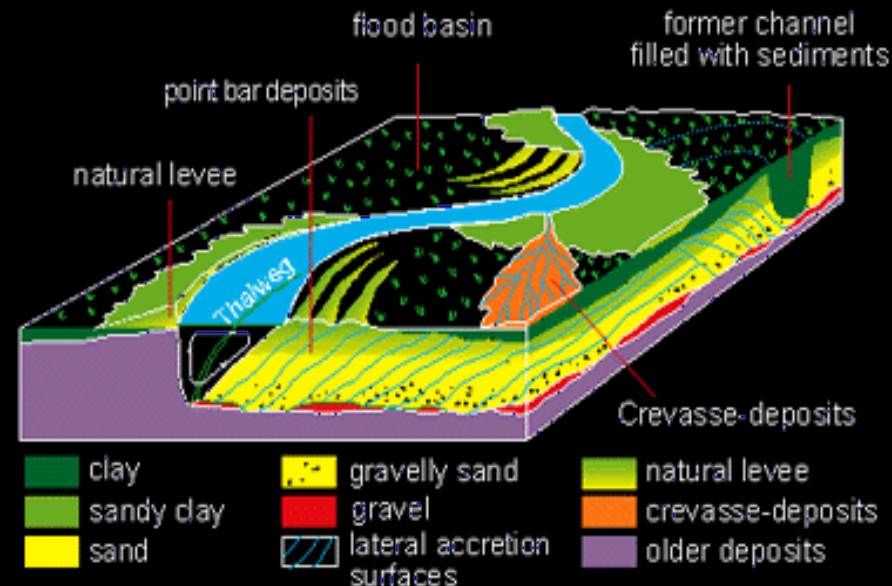
Fluvial system: river meander

Fosili - redki
- ribe, školjke, vretenčarji, rastline

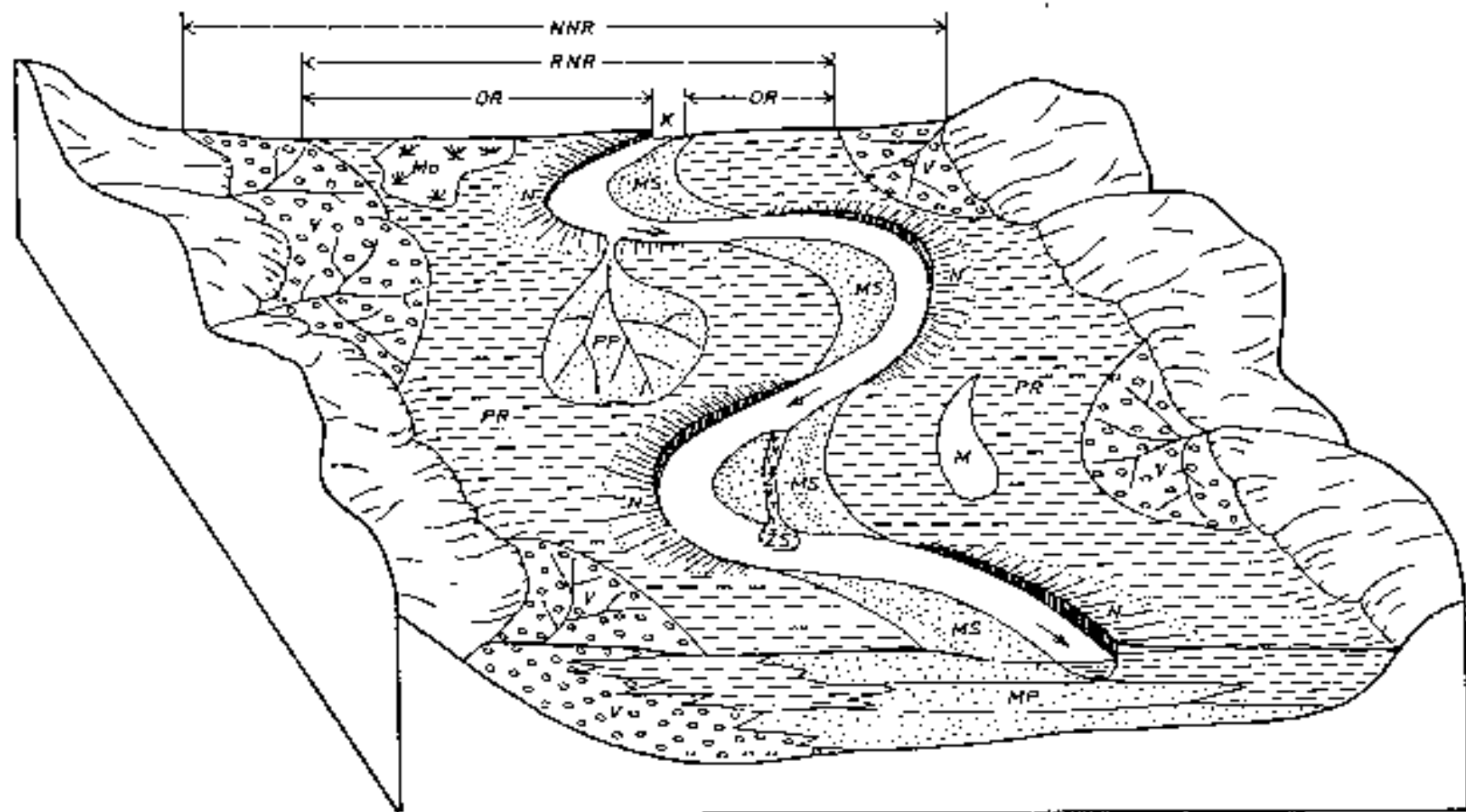
Jasni paleotransportni znaki

Faciesi

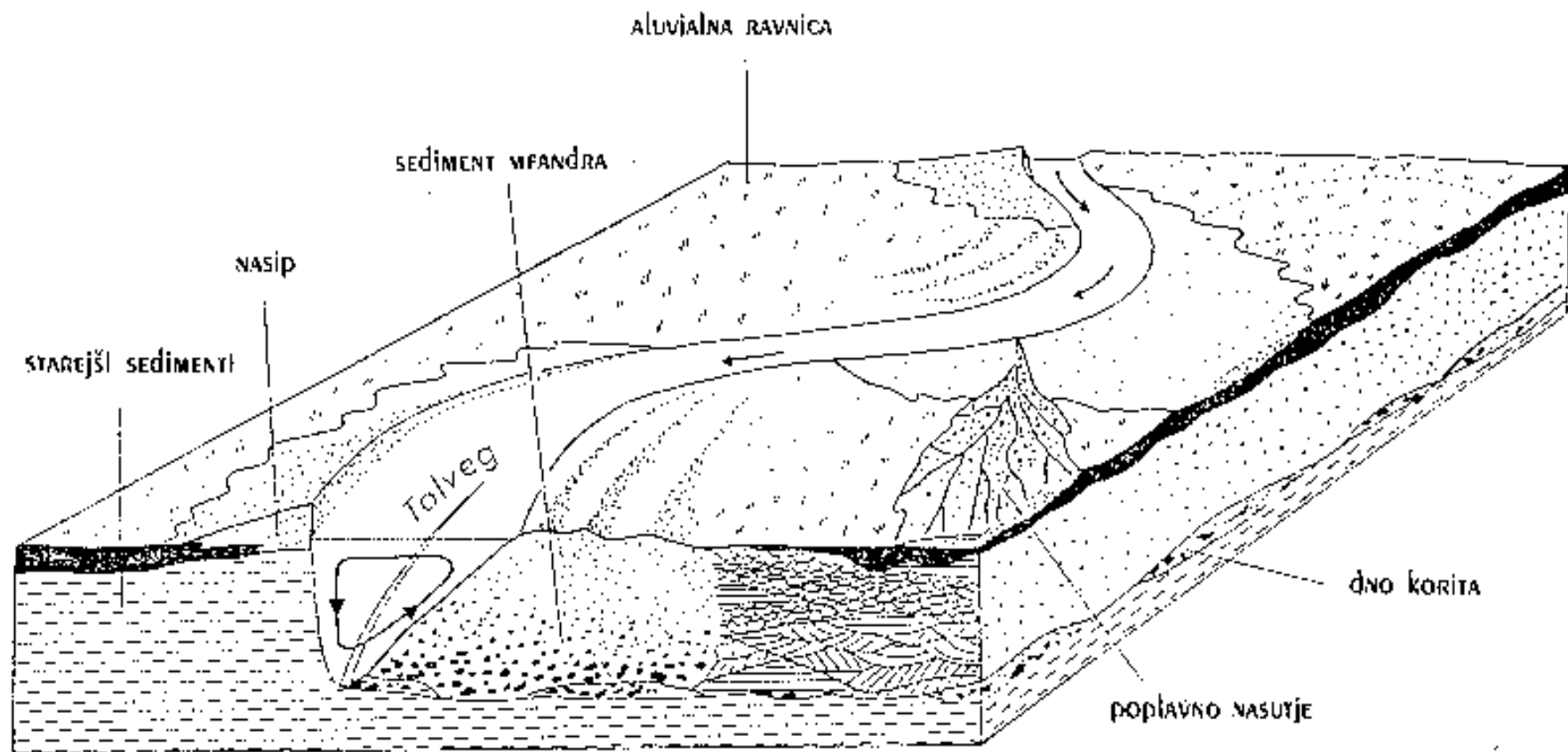
- različni tipi prodov z različno plastovitostjo
- peski z navzkrižno ali horizontalno plastovitostjo
- sipinice
- glinavci
- dine (talveg)



Block diagram of a meandering river



Sl. 1. Shema dolinskega zapisa z glavnimi geomorfnimi elementi meandrskega rečnega toka
 V Aluvialni vršaj; *PR* Poplavna ravnina; *N* Nasip; *PP* Prebojna pahljača; *MS* Meandrska sipina; *NNR* Površina dolinskega zasipa ali nasipno naplavna ravnina; *RNR* Rečna naplavna ravnina; *OR* Obrežna ravnina; *K* Korito; *MP* Meandrski pas; *Mo* Močvirje; *M* Mrtvica; *Ž* Žleb, *ŽS* Žlebna sipina



POSTOPNA
ZRNAVOST



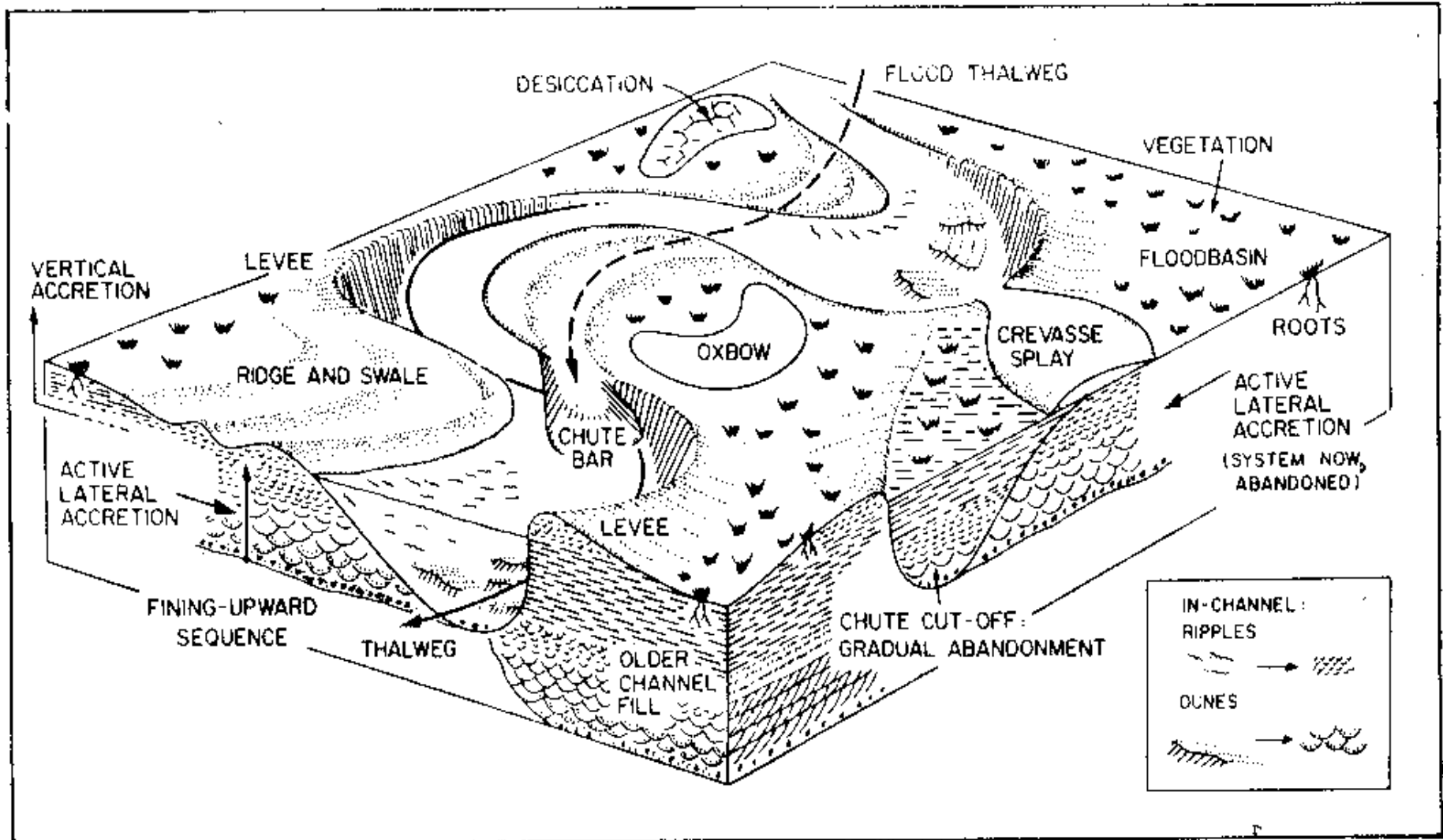
NAVZKRIŽNA
PLASTNATOST



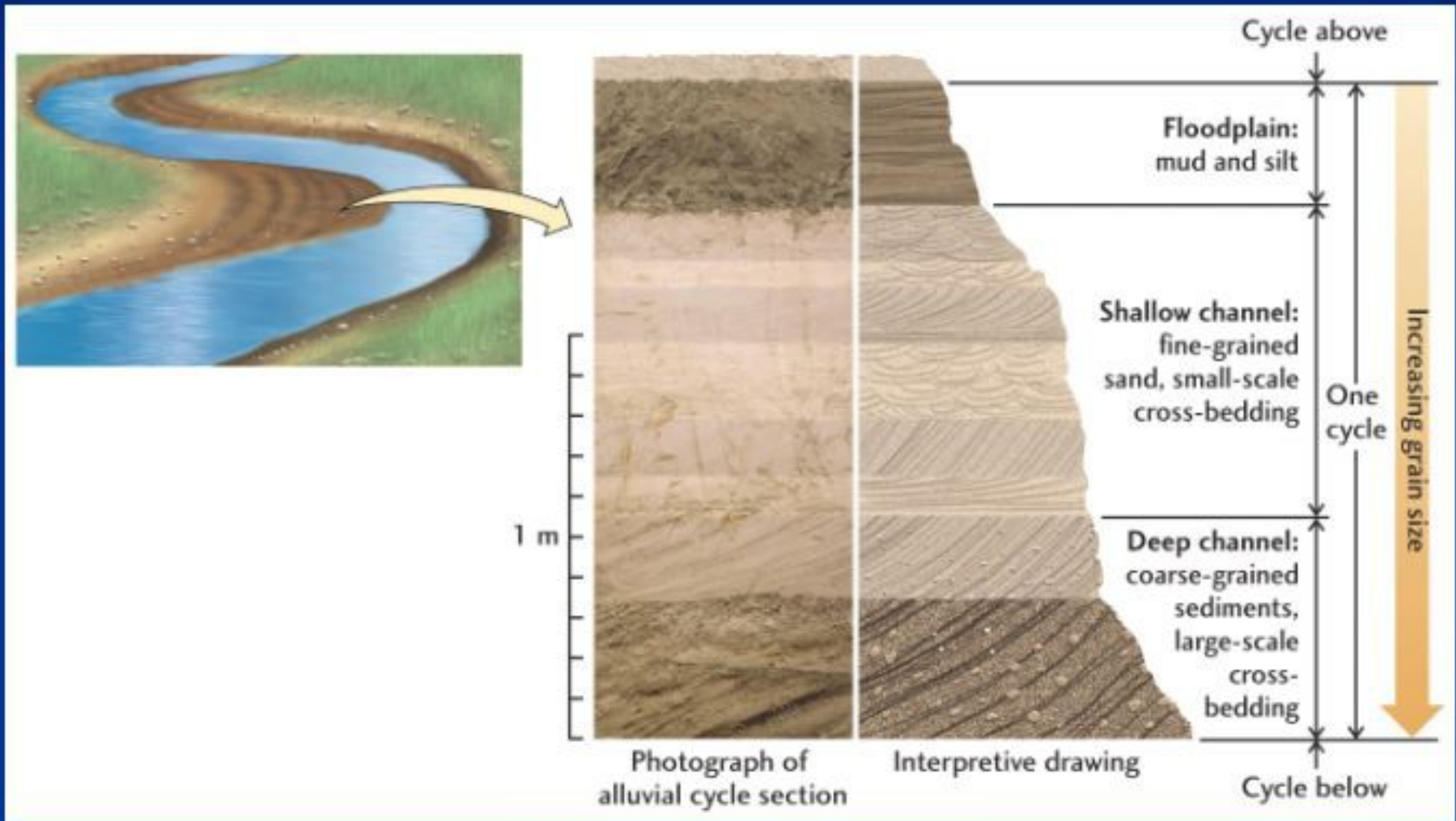
NAVZKRIŽNA
LAMINACIJA



VODORAVNE
PLASTI

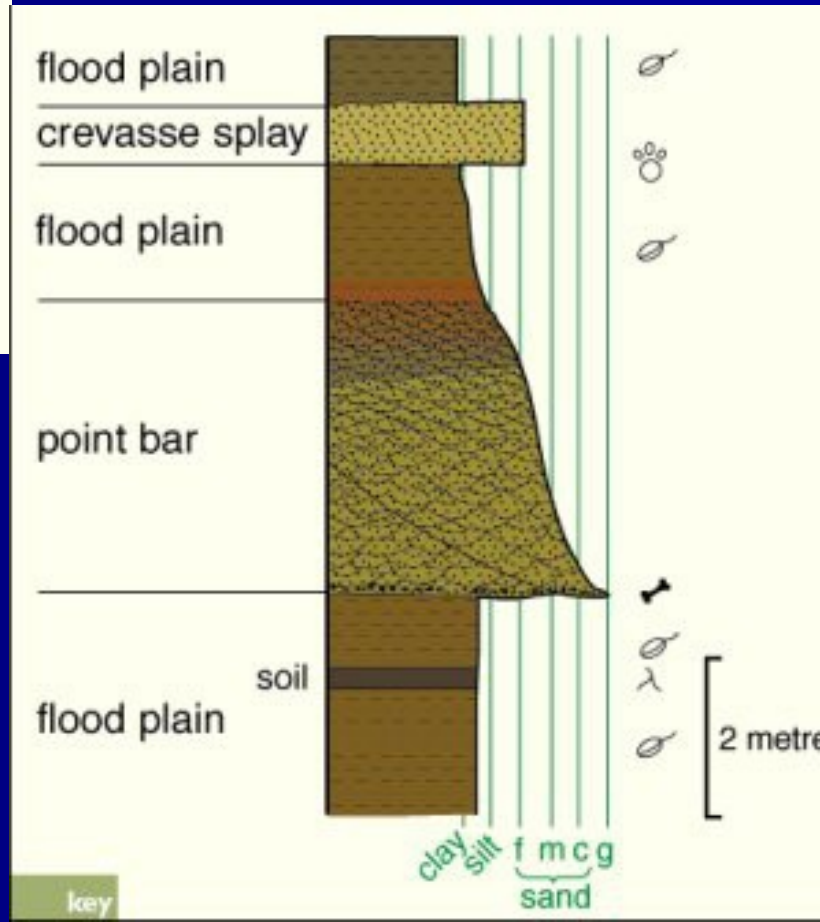
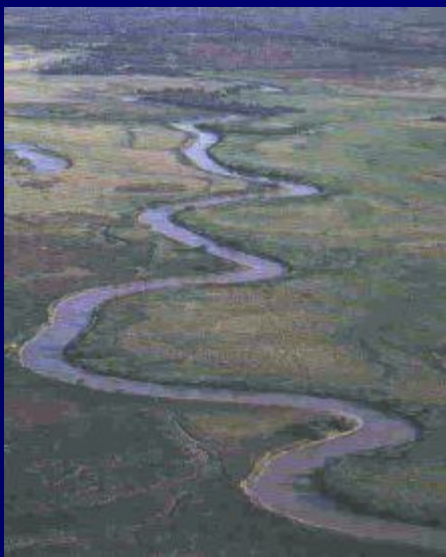
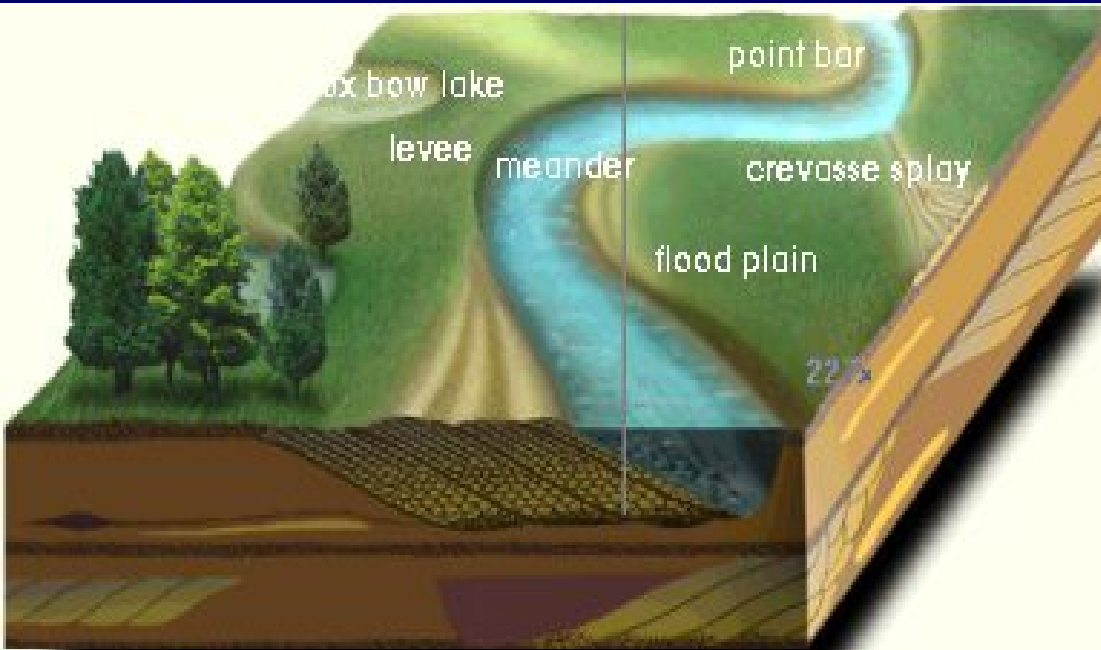


REČNI SEDIMENT



REČNA OKOLJA

MEANDRIRAJOČE REKE



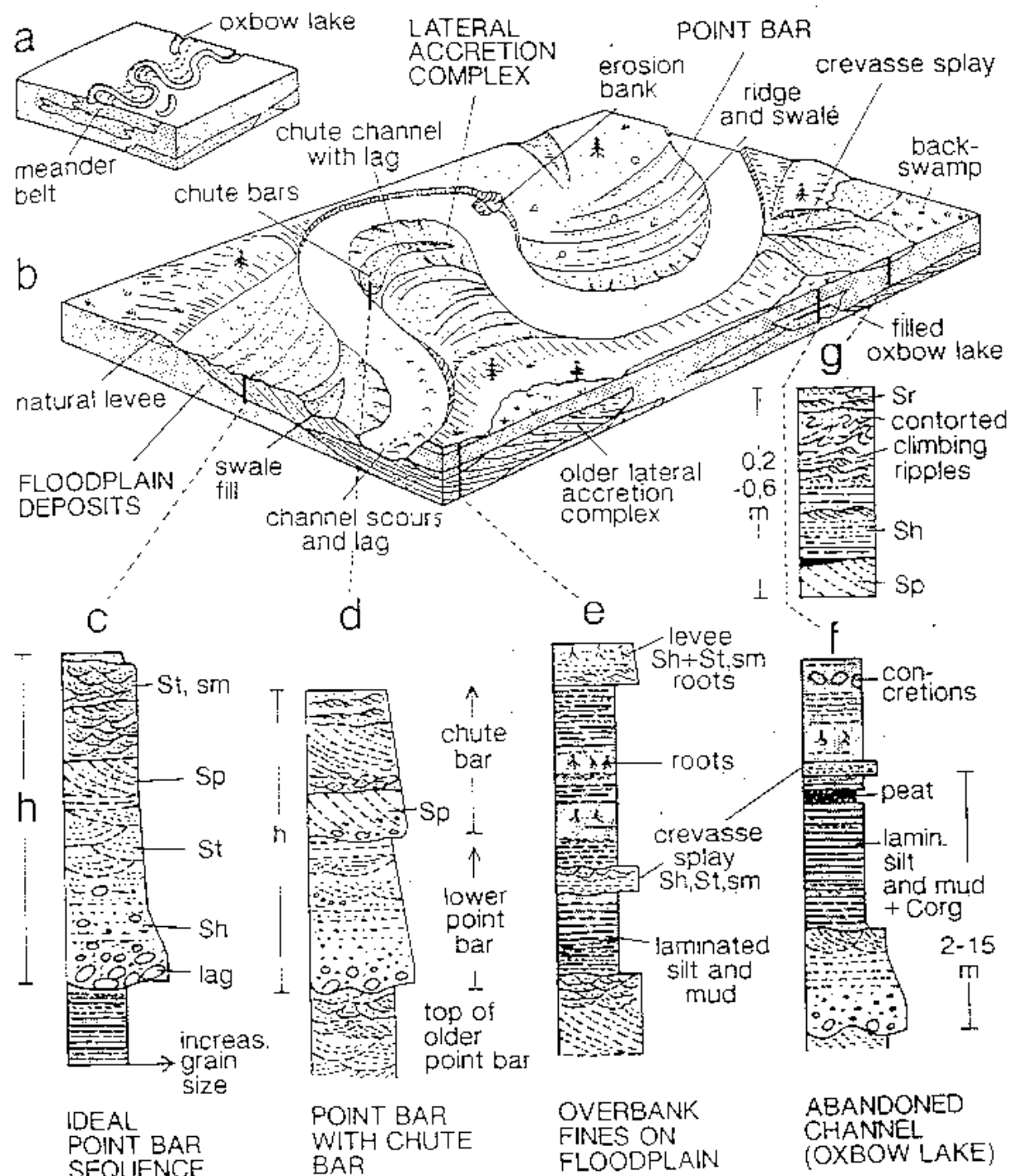
REČNA OKOLJA

MEANDRIRAJOČE REKE

a-peščen meandrski pas znotraj poplavnega bazena

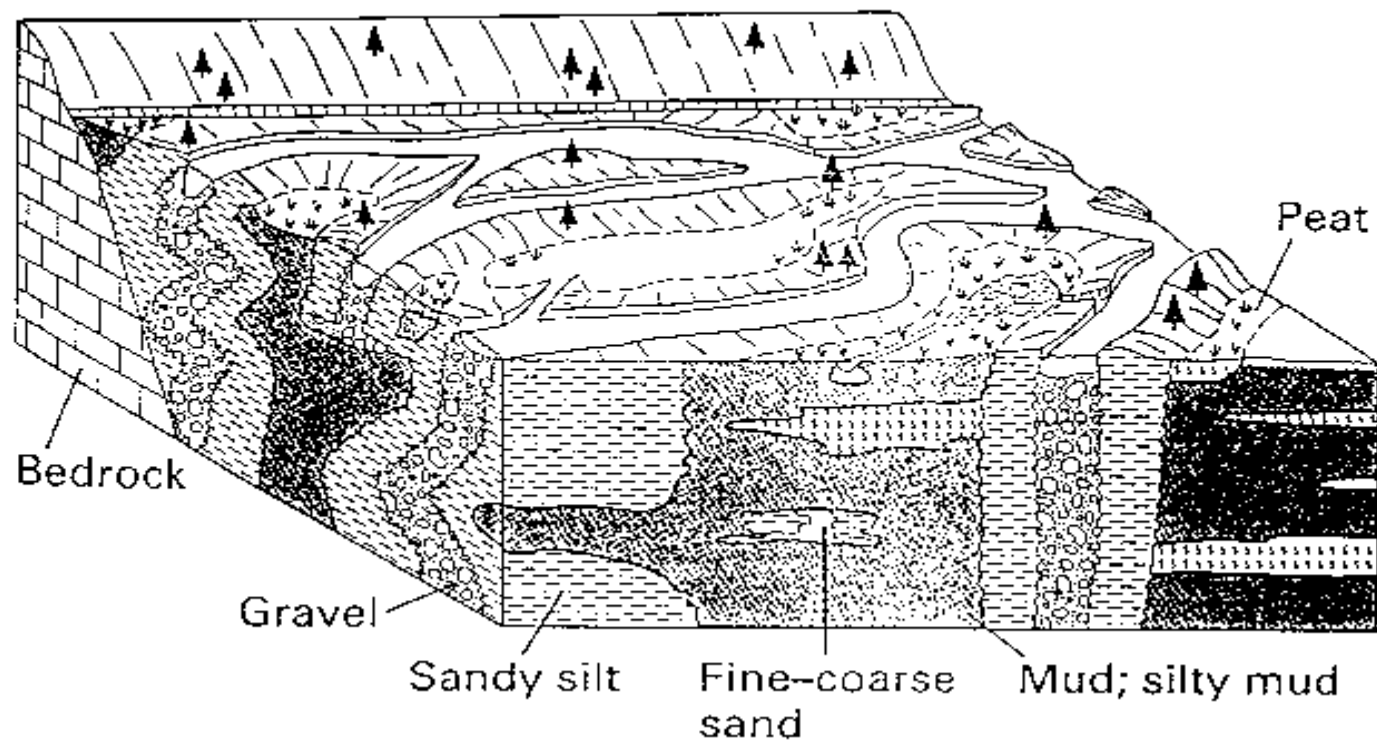
b-podokolja meandrskega kanala

c-g-značilni vertikalni preseki najmlajših sedimentov poplavnega bazena



- reka stagnira na istem mestu
- kanali stalni
- korita stabilna
- transport v suspenziji
- manjši premiki sipin
- drobnozrnat sortiran prod in pesek
- naplavne ravnice => močvirski sedimenti - glina
 - melj
 - organski ostanki
- subaerske teksture - izsušitvene razpoke
 - sledovi





Tridimenzionalni model razporeditve faciesov pod anastomosnim sistemom.
North Saskatchewan (Smith&Smith, 1980)

REČNA OKOLJA

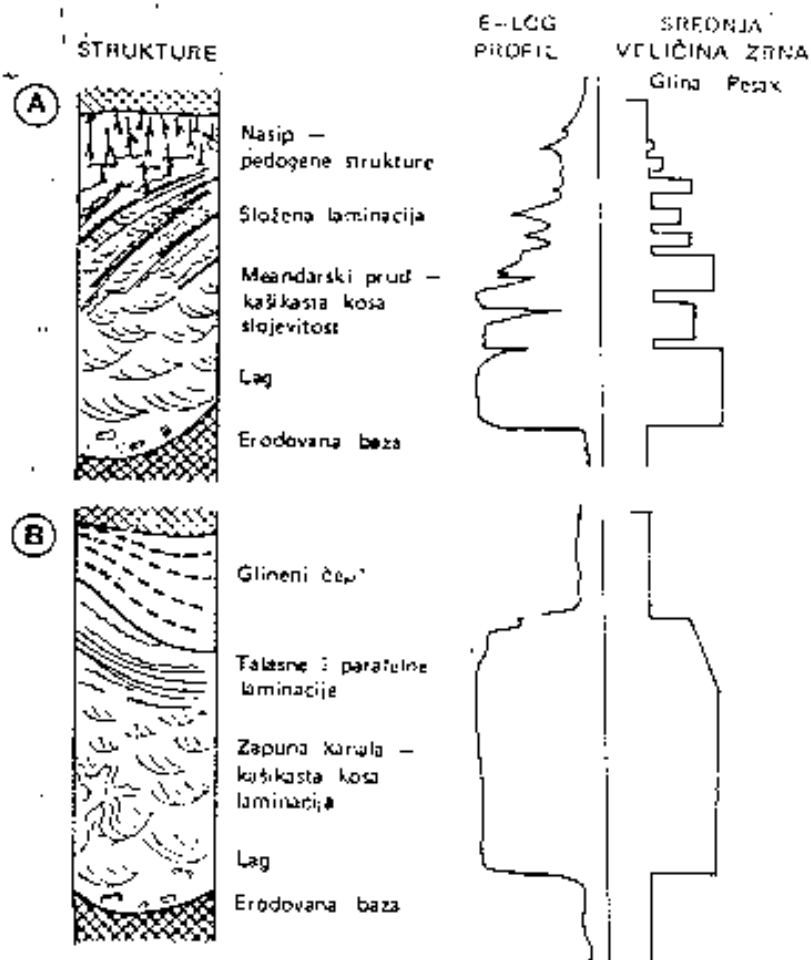
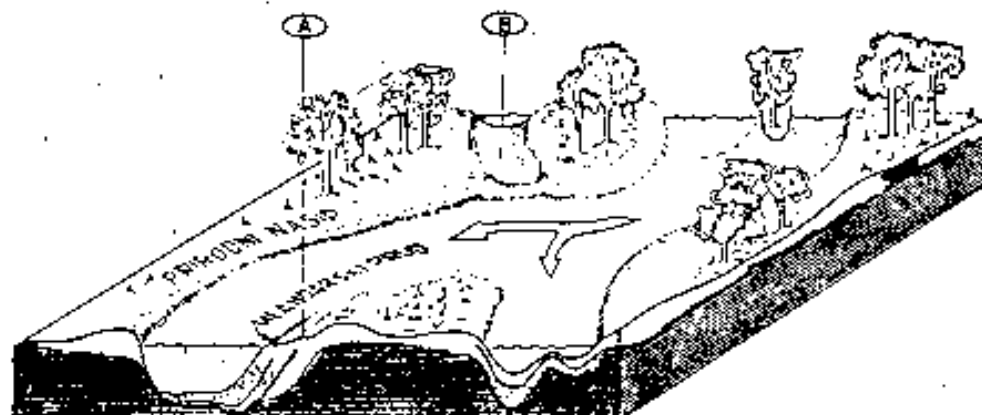
STAGNIRAJOČE REKE

Model anastomoznega rečnega sistema

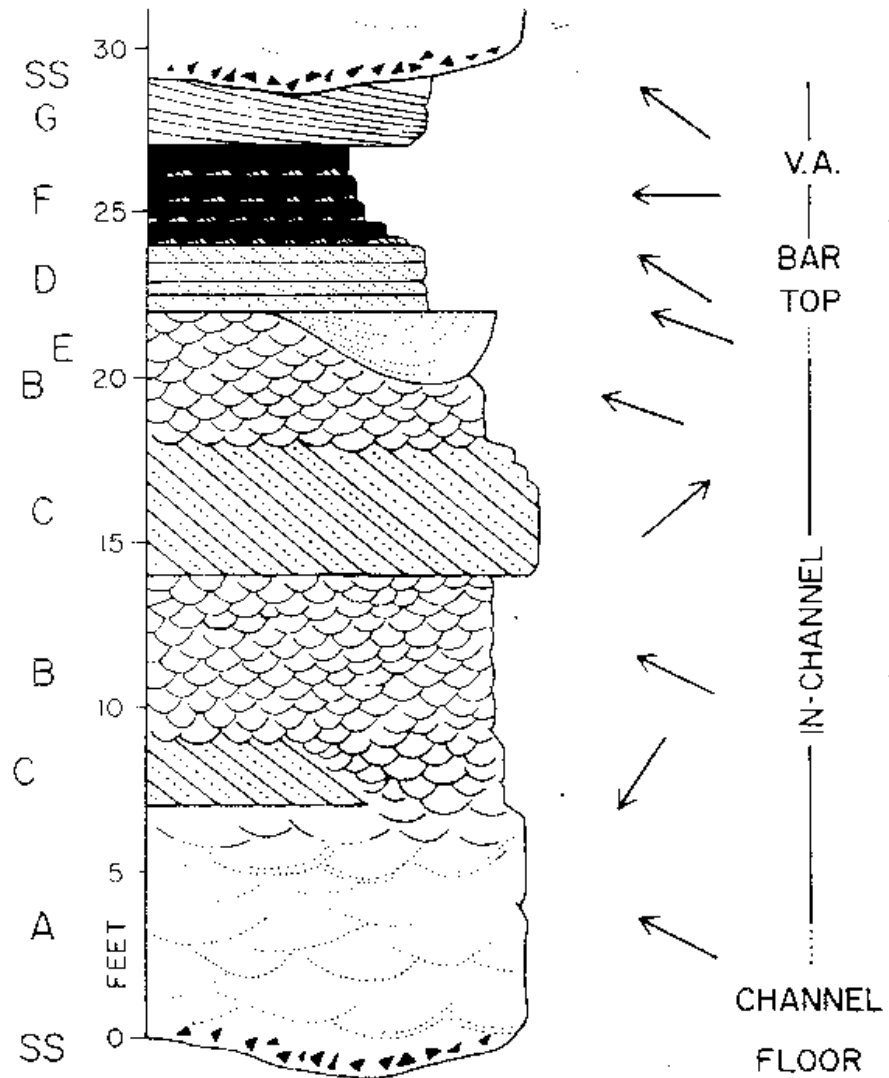
A - sekvenca bočne akrecije

B - sekvenca segmenta kanala s simetričnim zapolnjevanjem

(Galloway & Hobday, 1983)



BATTERY POINT SUMMARY SEQUENCE



JEZERSKA OKOLJA

Jezera - za pregradami

- ledeniški nasipi in morene
- plazovi
- tokovi lave
- vulkanski kraterji in kaldere
- ledeniške stopnice in kotanje
- eolske dine
- rečne poplavne ravnice
- kontinentalni grebeni in udorine

Epilimnij

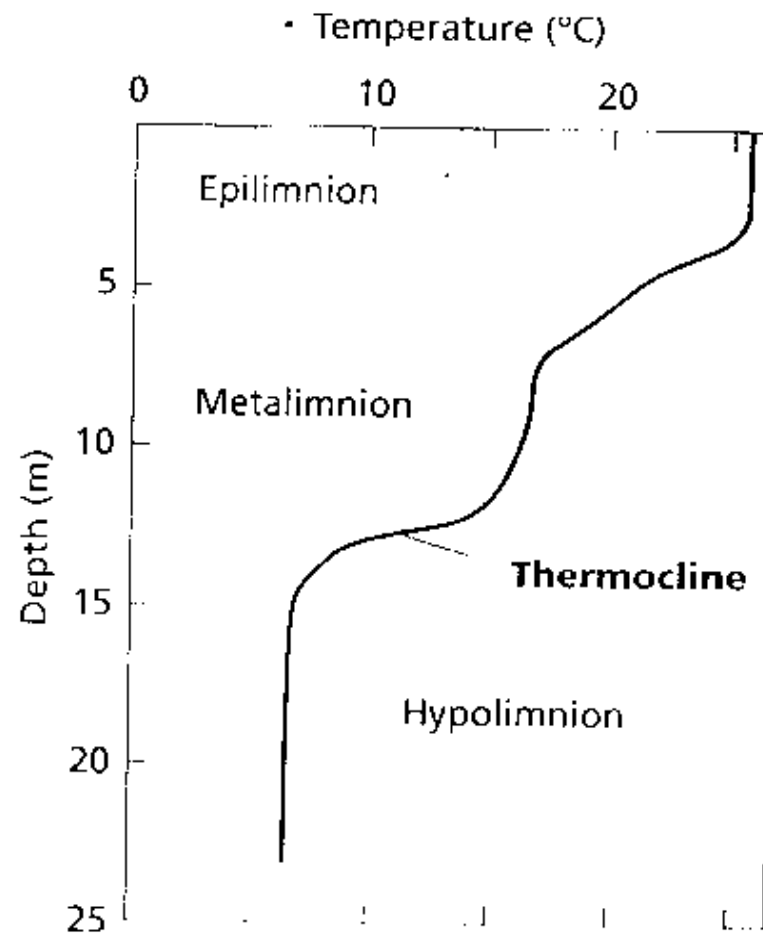
- sezonsko spreminjanje temperature
- stik z atmosfero (izmenjava plinov, T)
- svetloba (fotosinteza)

Metalimnij

- temperatura pada z globino (termoklina)
- globina kompenzacije kisika

Hipolimnij

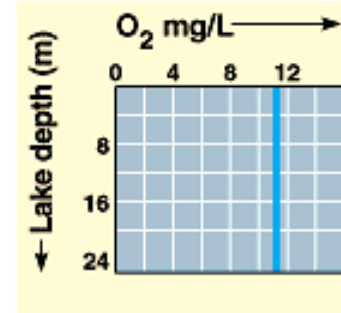
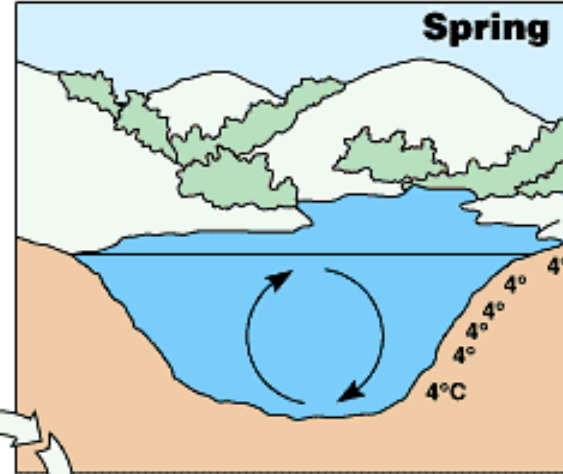
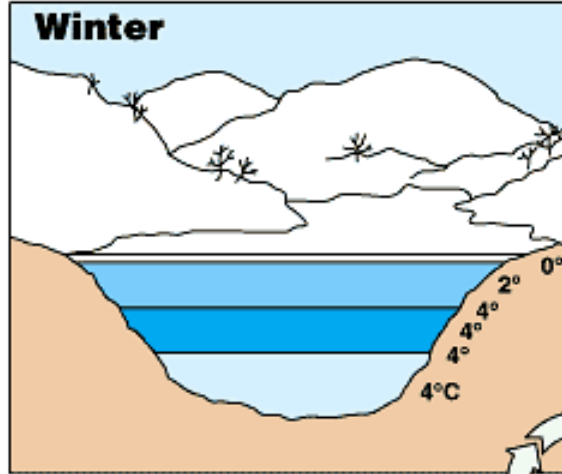
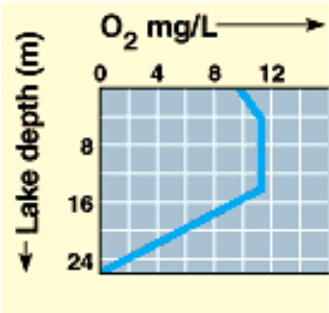
- stalno hladna voda
- razkrajanje organske snovi
- nižji pH



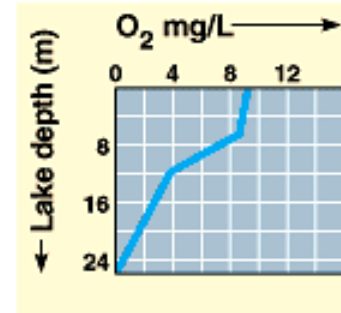
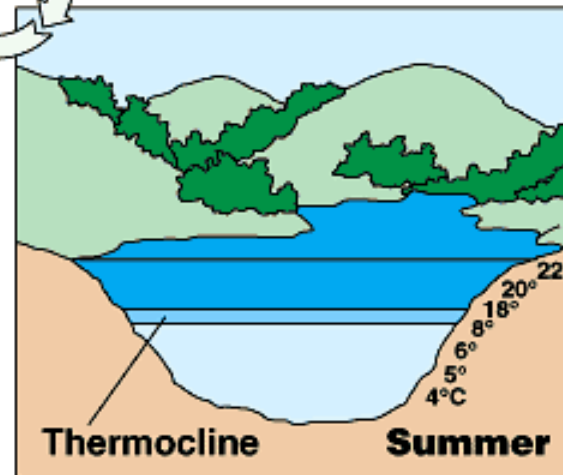
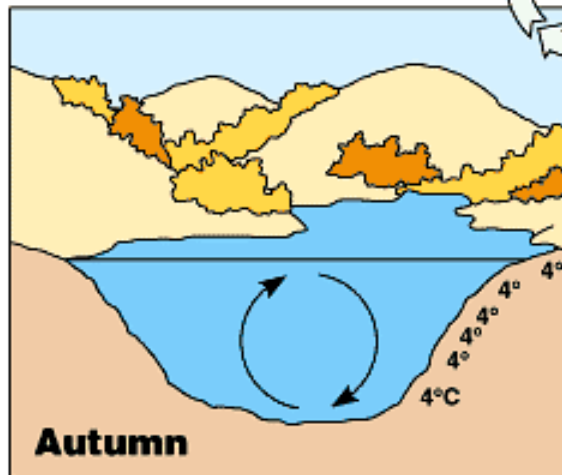
Shema stratifikacije vode v jezeru v poletnem obdobju (Wetzel, 1983)

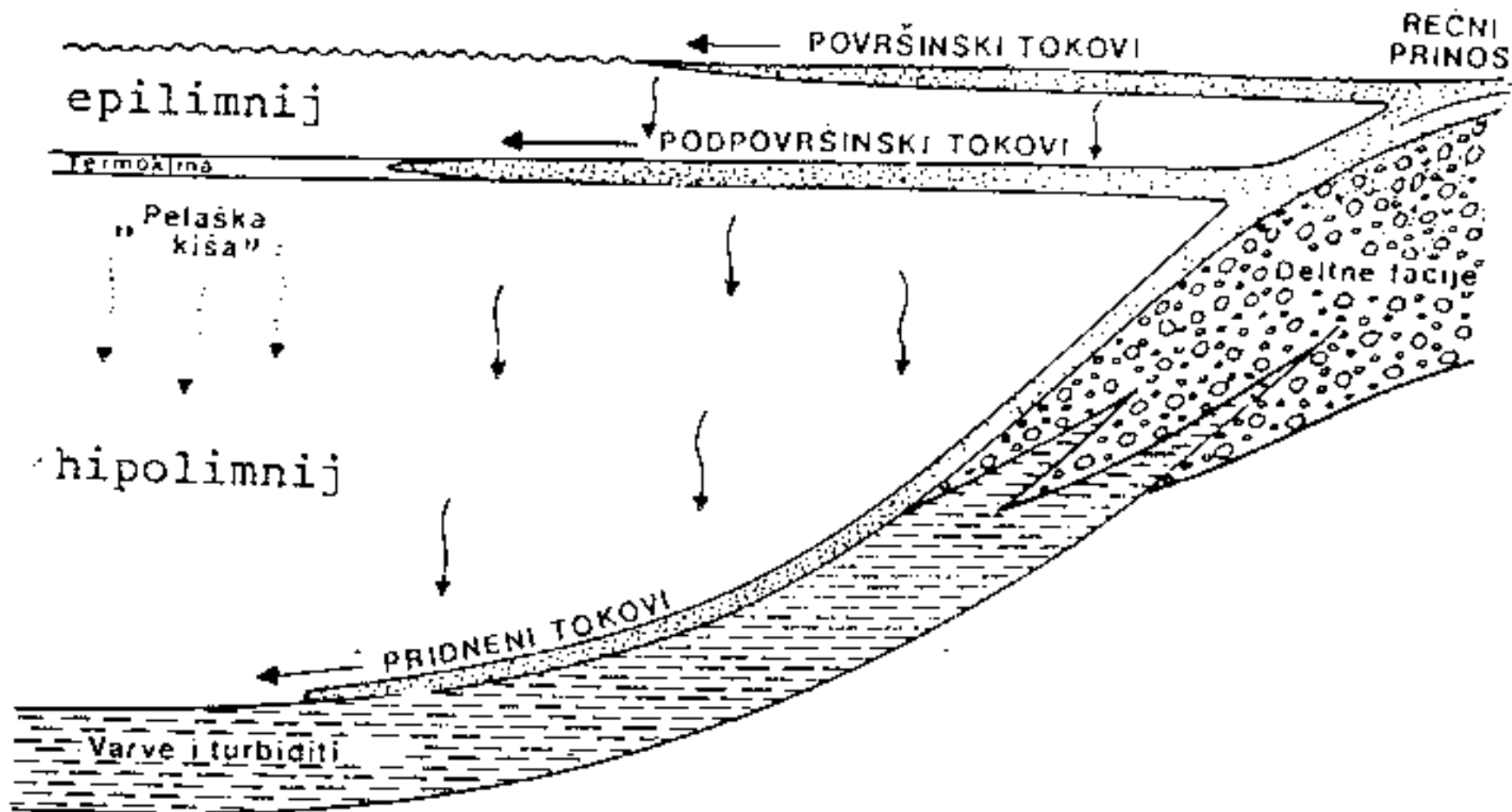
Klima - aridna, humidna, hladna, tropska

JEZERSKA OKOLJA



- High O₂ conc.
- Medium O₂ conc.
- Low O₂ conc.

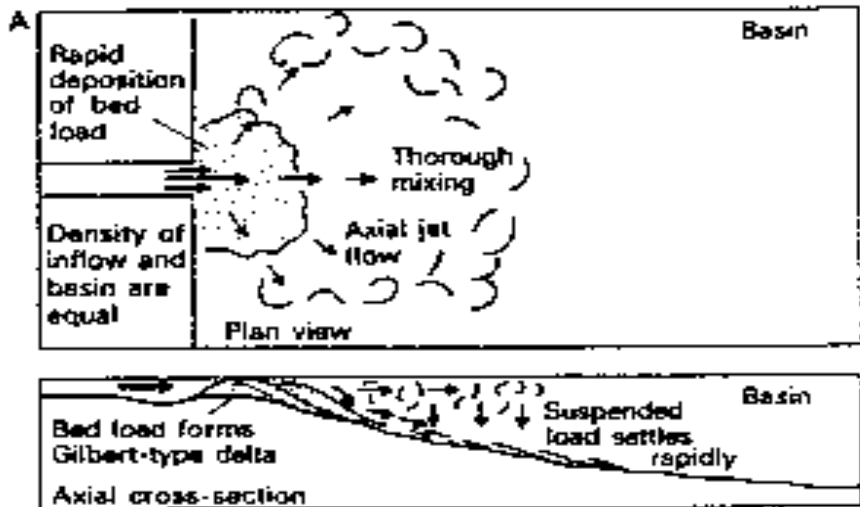




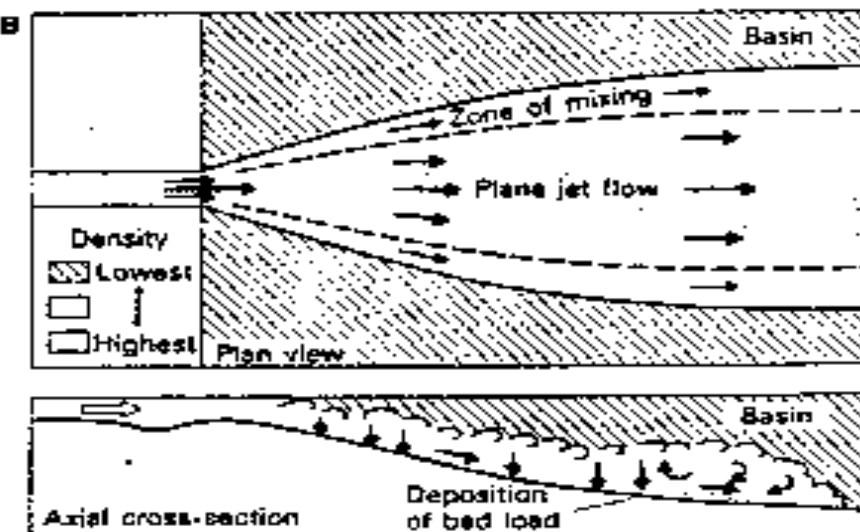
Mehanizmi toka in tipi sedimentov v stratificiranih jezerih z dotokom znatne količine klastičnega materiala (Sturm & Matter, 1978; Galloway & Hobday, 1983)

JEZERSKA OKOLJA

Interakcija pritokov bogatih s sedimentom z jezersko vodo



A-enaka gostota (homopycnal)
- intenzivno lokalno tridimenzionalno mešanje
in sedimentacija ob izlivu

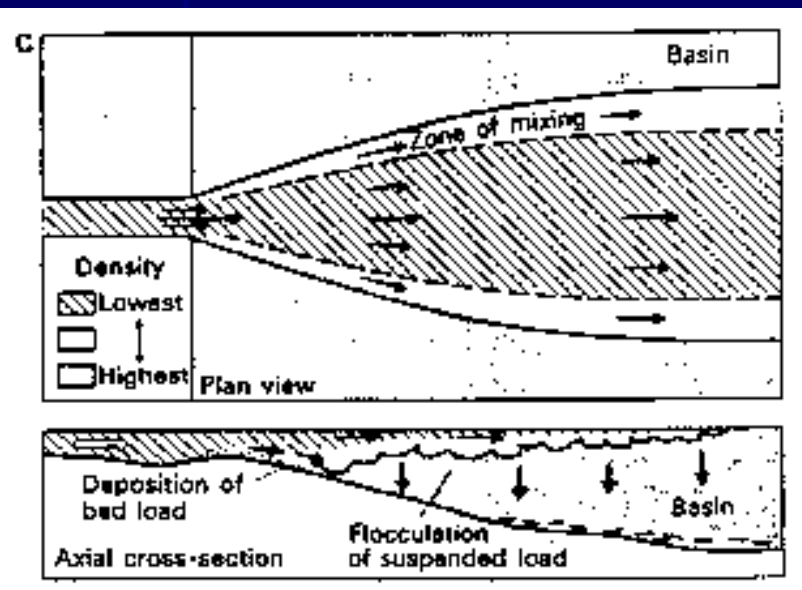


B-večja gostota pritoka (hyperpycnal)
-ob poplavad (gosti tok)

JEZERSKA OKOLJA

Interakcija pritokov bogatih s sedimentom z jezersko vodo

C-manjša gostota pritoka (hypopycnal)
-površinski tok



Sistemi jezer

Dotok: reke, potoki, meteorne vode, dež, podtalnica

Odtok: podtalnica, evaporacija

Odprti sistemi jezer:

Oligotrofno jezero

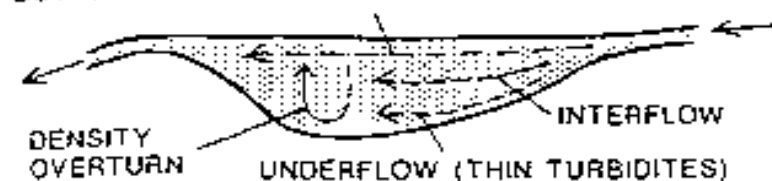
-malo hranil in živih organizmov

-veliko kisika

-ni permanentne stratifikacije

a "OPEN" LAKE SYSTEMS

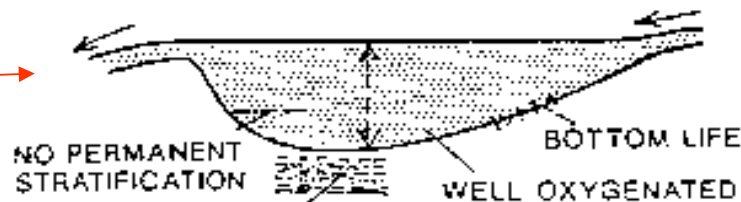
OUTFLOW OVERFLOW INFLOW



WATER FRESH OR SLIGHTLY BRACKISH.
RIVER-DOMINATED CLASTIC SEDIMENTS.
TENDENCY TO:

a₁ OLIGOTROPH

LITTLE NUTRIENTS



ANNUAL VARVES OR POOR LAMINATION.
LITTLE ORG. MATTER, PARTLY IRON HYDROXIDES, TURBIDITES

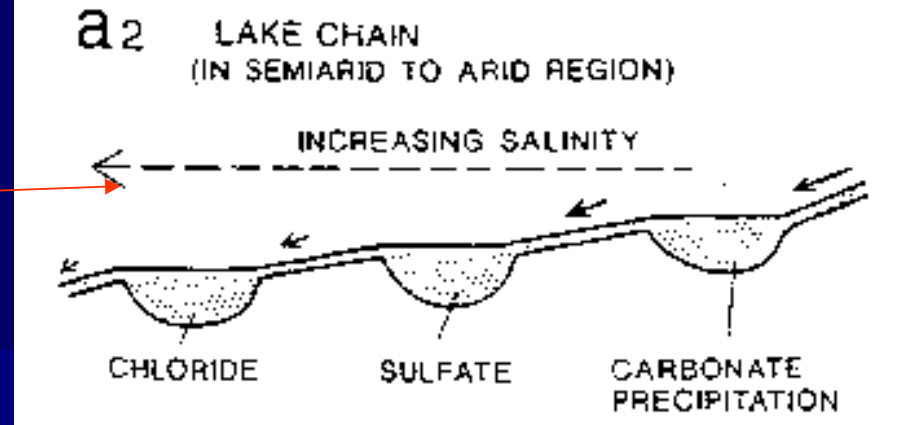
JEZERSKA OKOLJA

Sistemi jezer

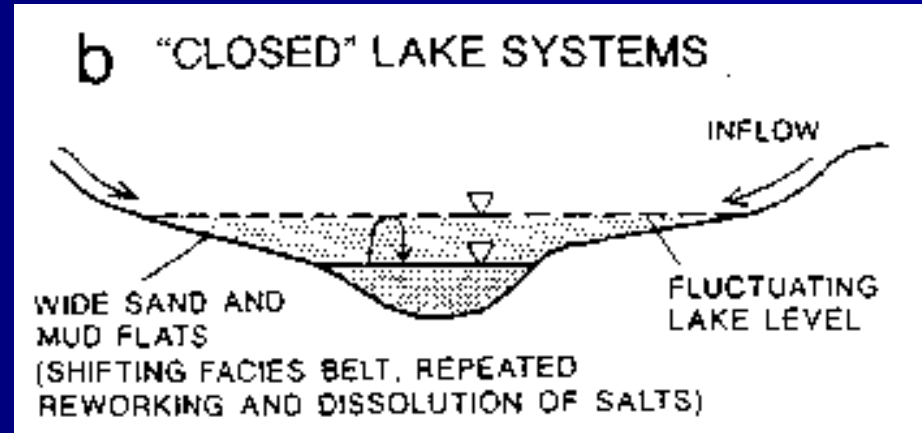
Odprti sistemi jezer:

Verižna jezera

-semiaridna do aridna klima

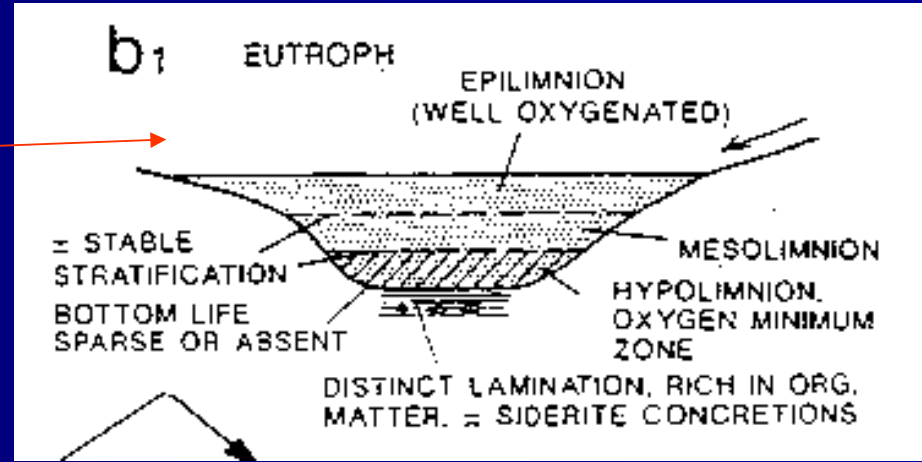


Zaprti sistemi jezer:



Eutrofna jezera

- permanentna stratifikacija
- visoka organska produktivnost
- malo kisika

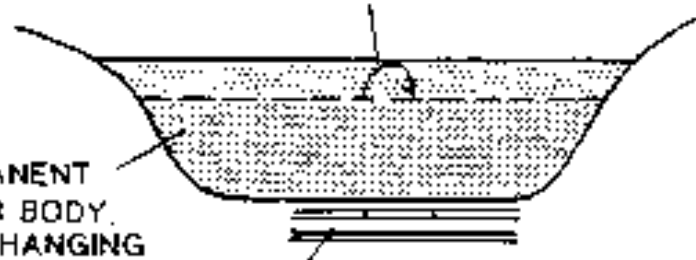


b2 PERENNIAL LAKES

FLUCTUATING LAKE LEVEL

PERMANENT WATER BODY, BUT CHANGING SALINITY

BEDDED CARBONATES AND/OR THICK EVAPORITES ALTERNATING WITH FINE-GRAINED CLASTICS OR BLACK SHALES



b3 EPHEMERAL LAKES (PLAYA, INLAND SABKHA)

MUD CRACKS, CRUSTS OF MG-CALCITE, DOLOMITE, GYPSUM, OR HALITE

FRESHWATER CARBONATE (SPRING)

EVAPORATIVE PUMPING FROM HIGH WATER TABLE

CENTRAL THIN SALT DEPOSITION, ALTERNATING WITH CLASTICS



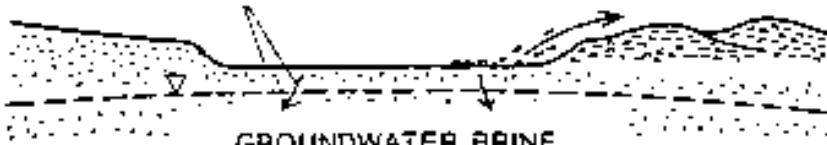
Nivo vode pod jezerskim dnom

b4 WATER TABLE BELOW LAKE FLOOR

DEFLATION AND LEACHING OF SALTS

CLAY DUNES (WIND-BLOWN CLAY PELLETS)

GROUNDWATER BRINE



Sistem: morje - laguna - jezero

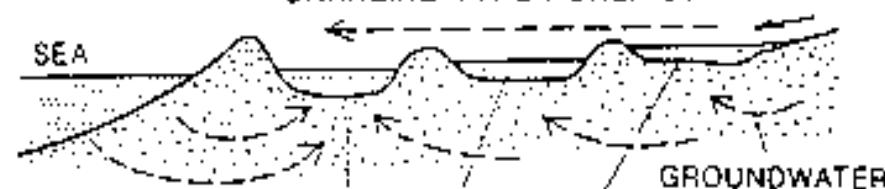
C SEA-LAGOON-LAKE SYSTEM

CHANGING WATER CHEMISTRY

SEA

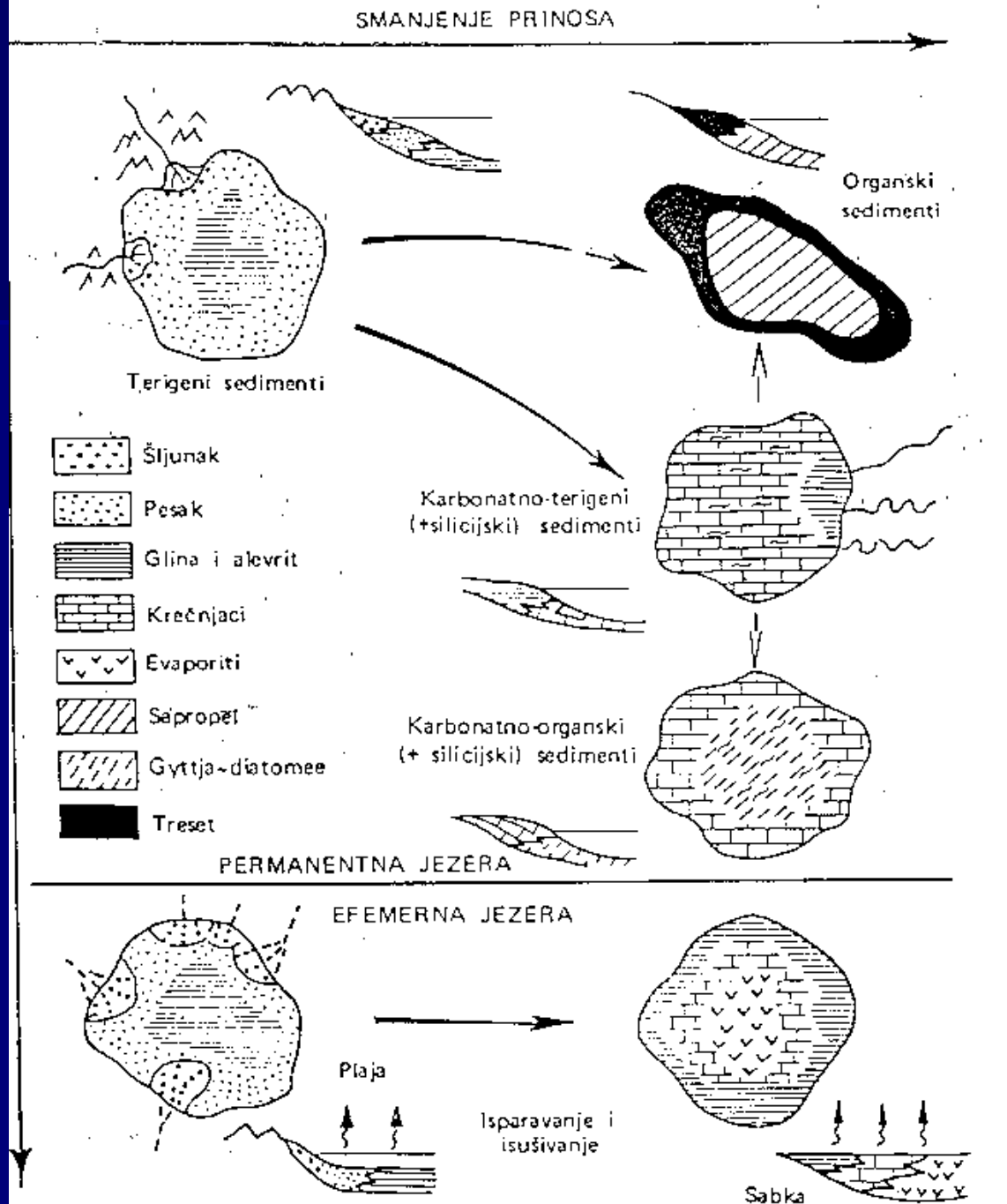
GROUNDWATER

DIFFERENT CARBONATES (INCL. DOLOMITE)



Depozicijski tipi jezer

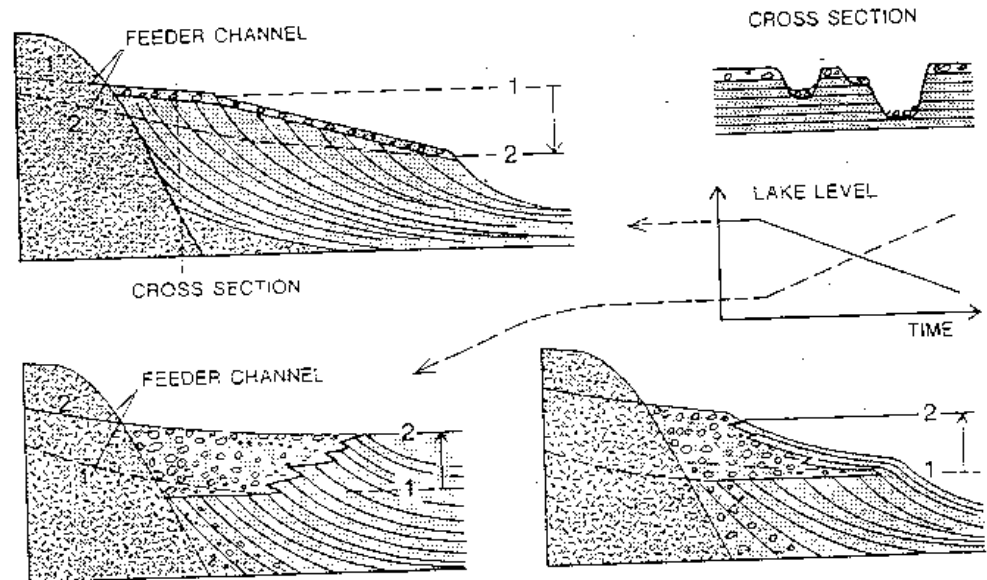
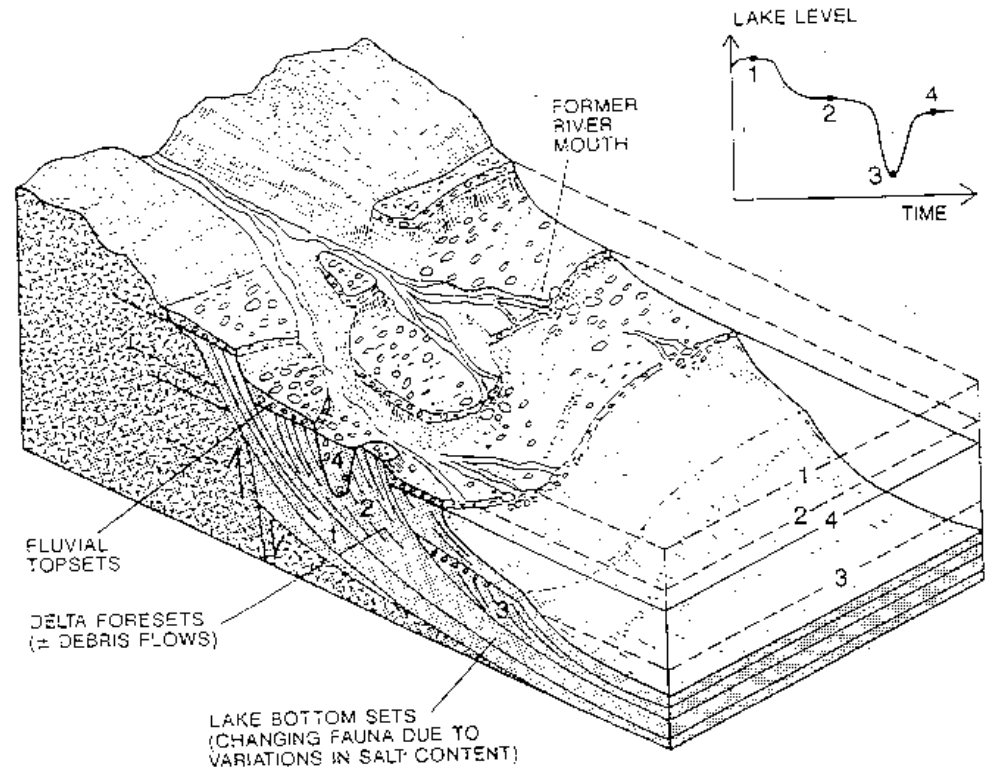
- evolucijske faze
(Ricci Lucchi, 1979)



7-1. Depozicioni tipovi jezera. Strelice pokazuju evolutivne stadije kroz koje

JEZERSKA OKOLJA

Fluvialne terase, nasipi rečnega ustja in jezerski sedimenti na katere vpliva nivo gladine jezera (faze 1-4)

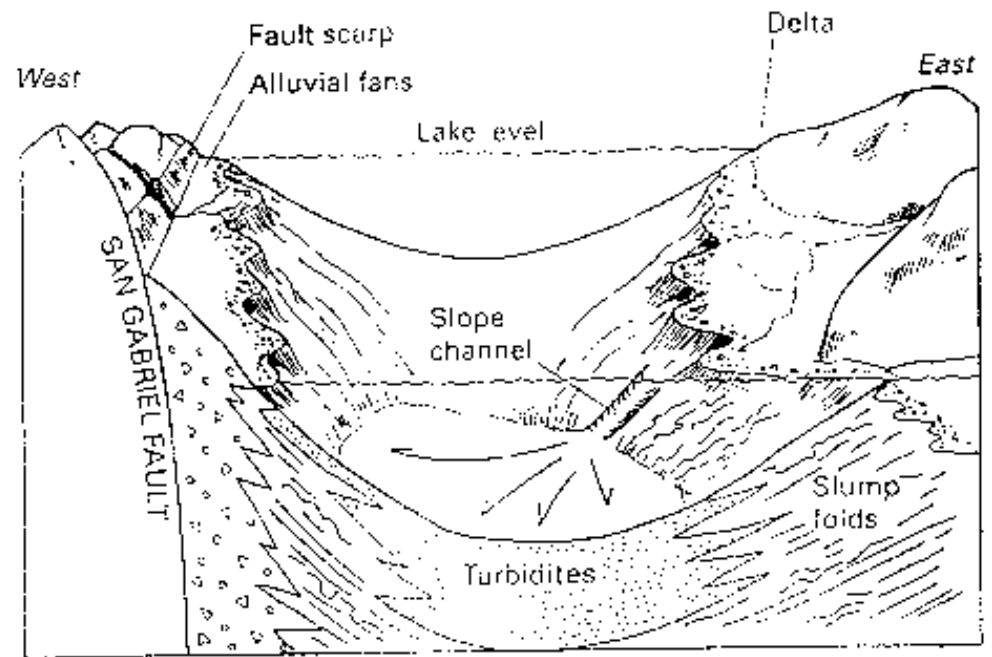


JEZERSKA OKOLJA

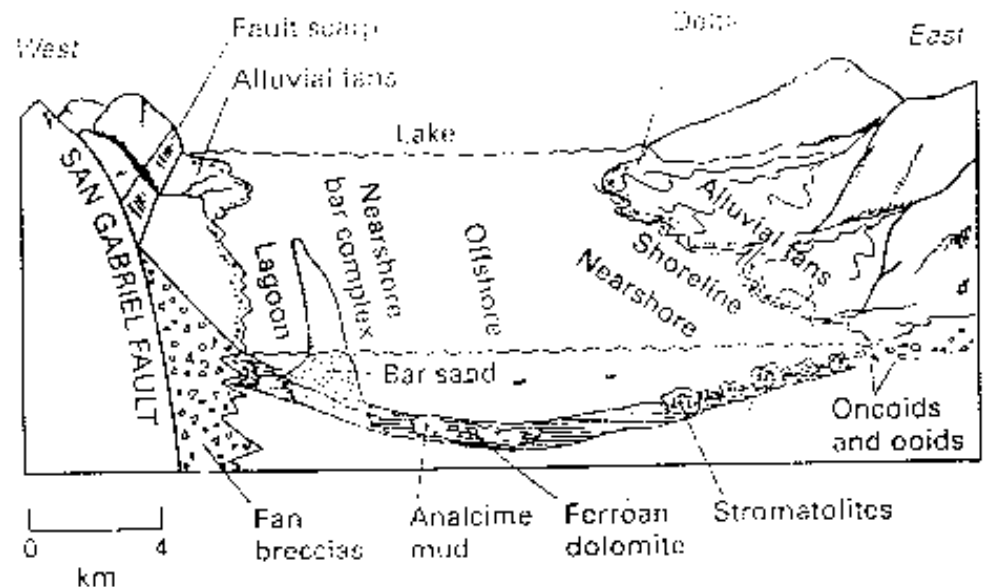
Rekonstrukcija paleookolja
a-globlje vodna lakustrična faza
b-plitvodna lakustrična faza

(Link&Osborne, 1978)

(a) Open lake basin



(b) Closed lake basin



JEZERSKA OKOLJA

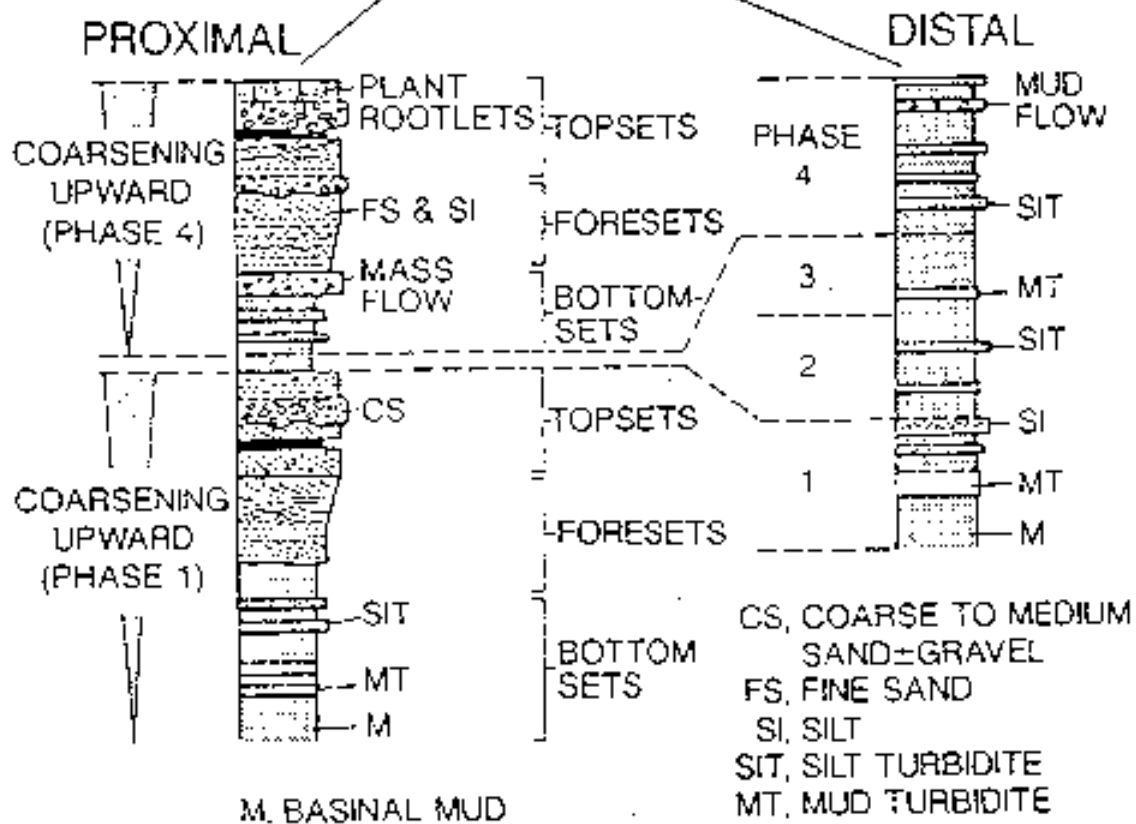
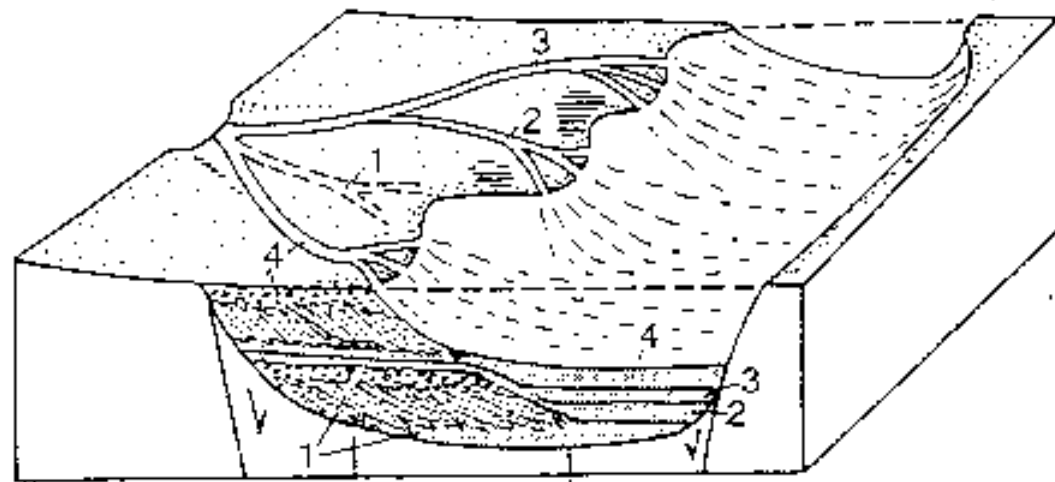
Faciesi nastali pri premikajočem rečnem izlivu in poglobljanju jezerskega dna:

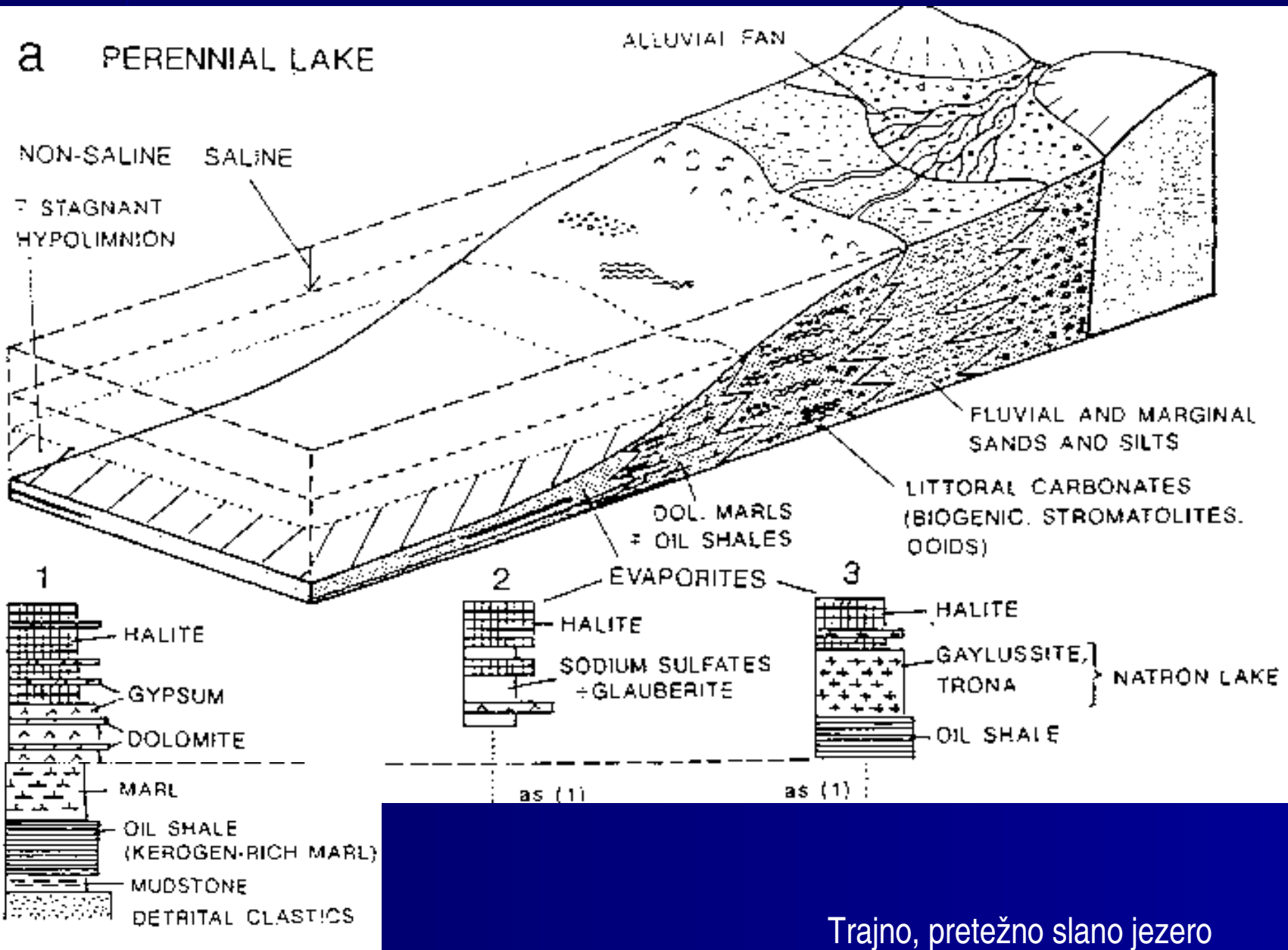
Proksimalni

-naraščanje velikosti zrn sedimenta odraža približevanje sprednjega dela delte

Distalni

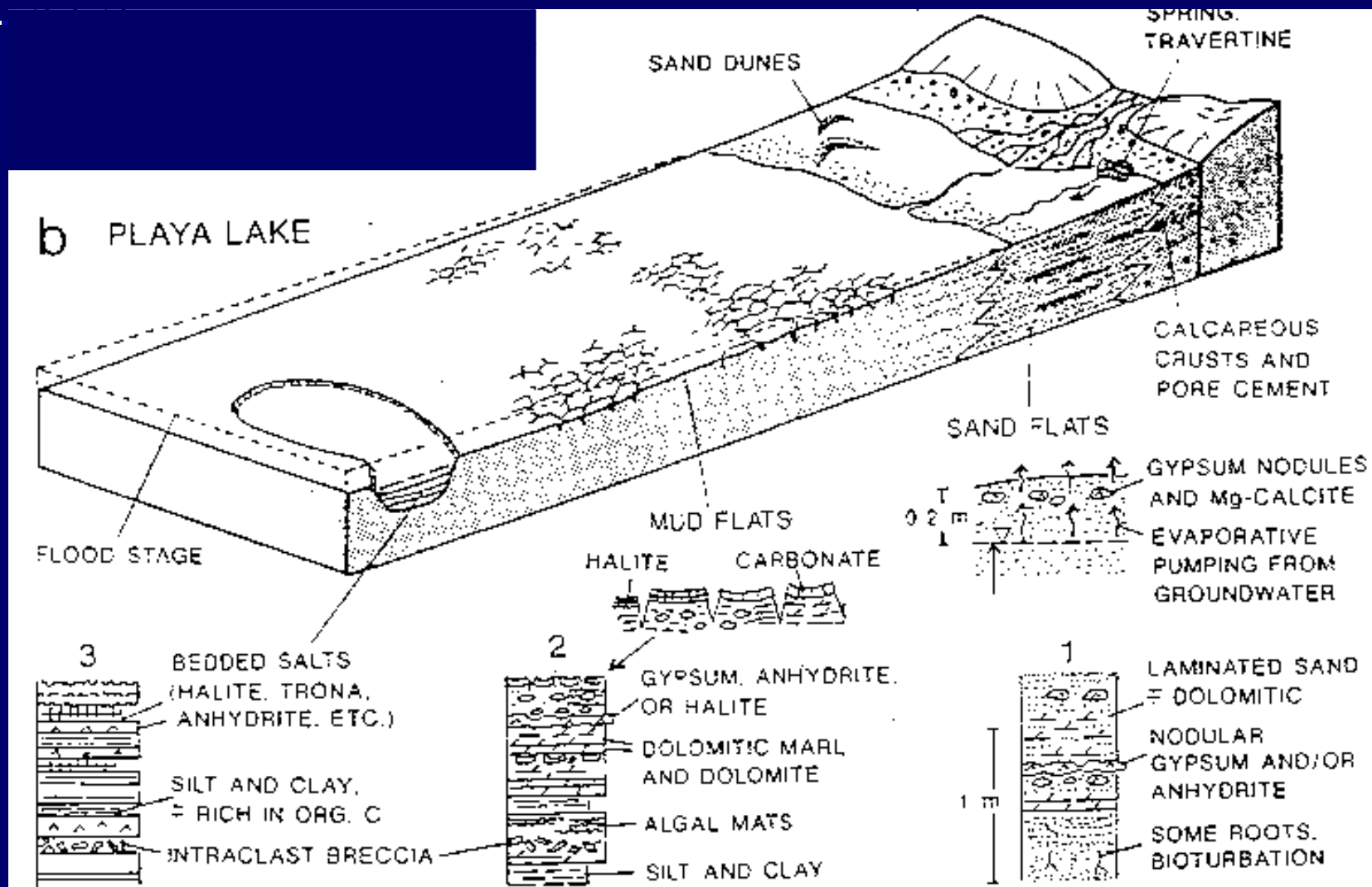
-drobneje zrnat sediment z občasnimi blatnimi tokovi





Trajno, pretežno slano jezero

Občasna (playa) jezera (kontinentalne sabhke)



JEZERSKA OKOLJA

Ciklični razvoj sedimentov slanih bazenov

I - poplavljanje

-raztapljanje solne skorje in
sedimentacija mulja

II - evaporacija

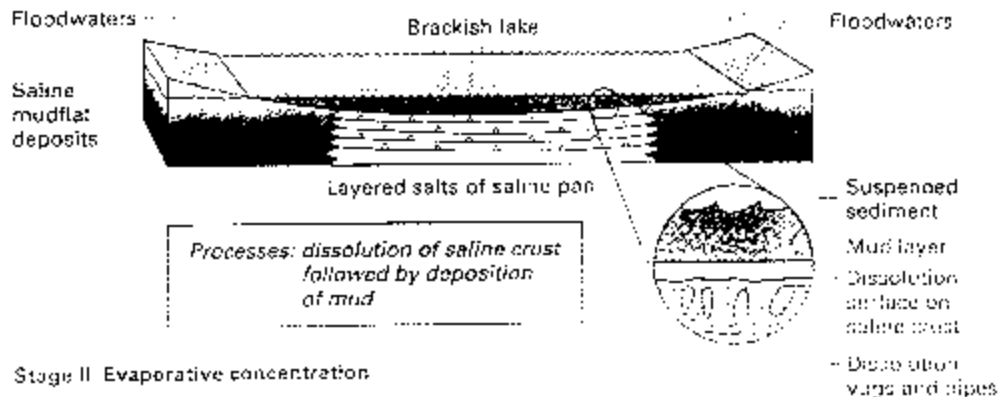
-podvodna kristalizacija soli

III - izsuševanje

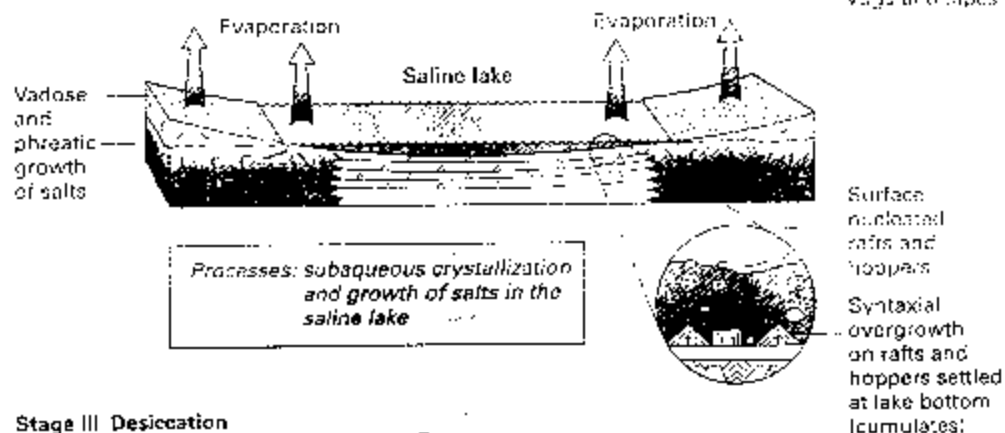
-diagenetska rast soli

-poligonalna razpokanost skorje

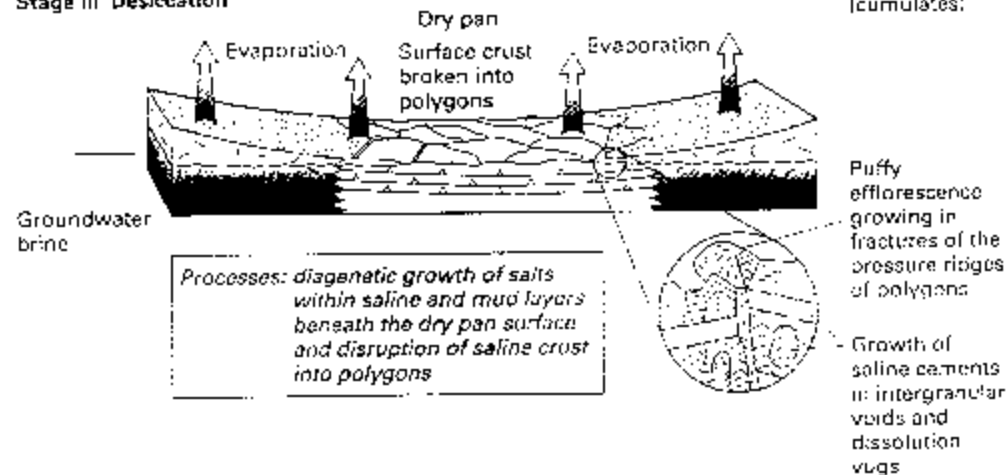
Stage I Flooding



Stage II Evaporative concentration



Stage III Desiccation



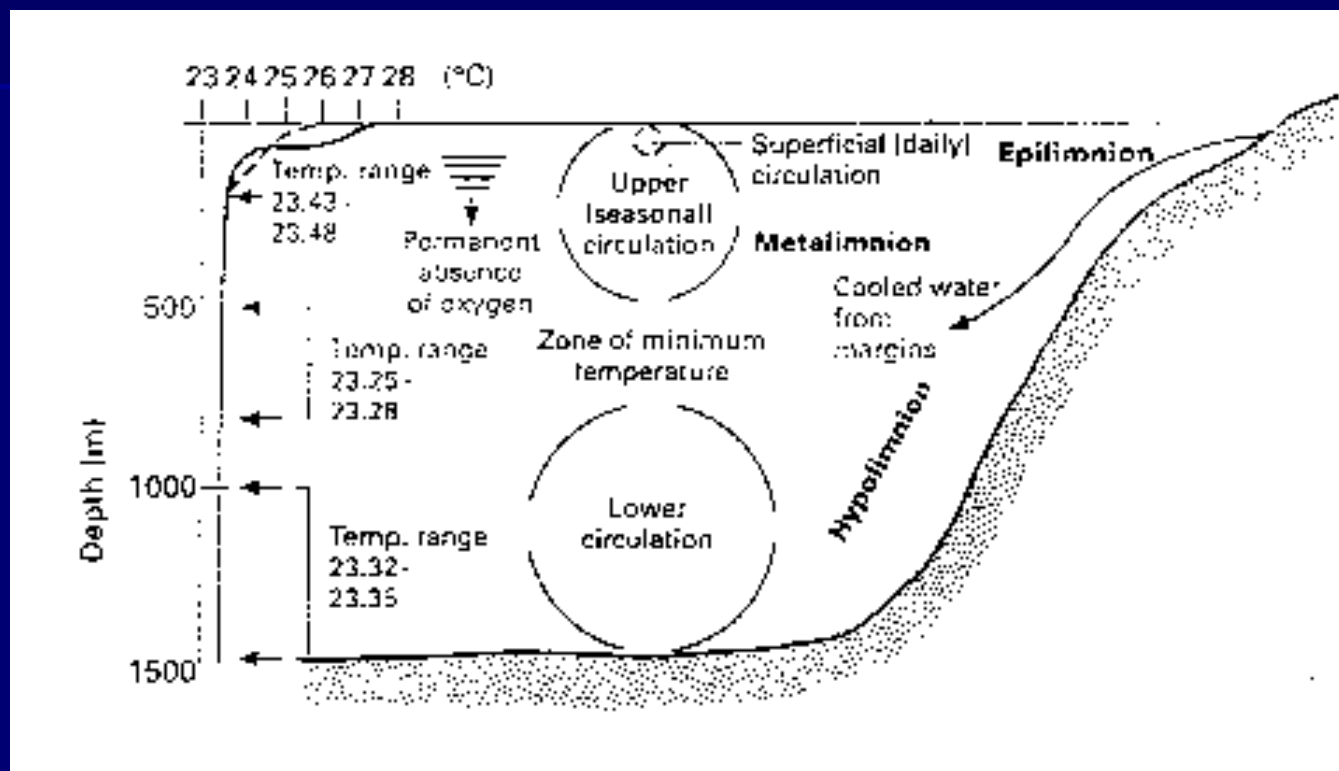
JEZERSKA OKOLJA

Temperaturni profili in cirkulacije v različnih pasovih vodnega stolpca (Lake Tanganyika)

Epilimnij: 50-80m
- dnevna cirkulacija
(delovanje vetra)

Metalimnij:
-vsaj 200m
(sezonske cirkulacija)

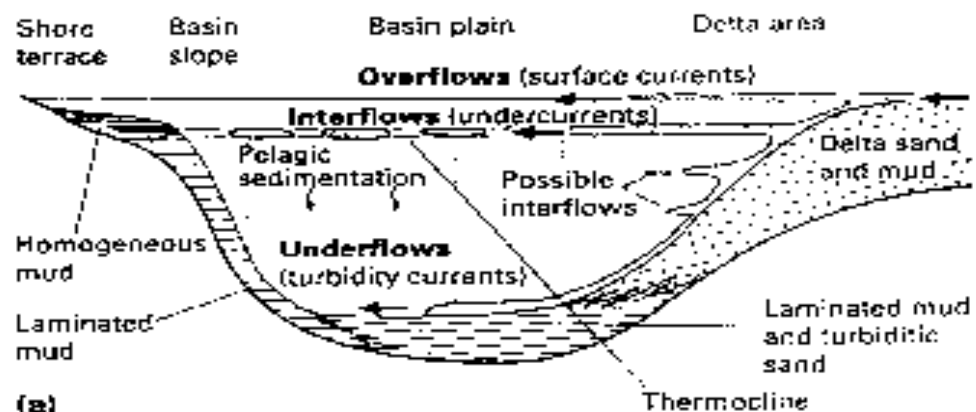
Hipolimnij:
-anoksičen



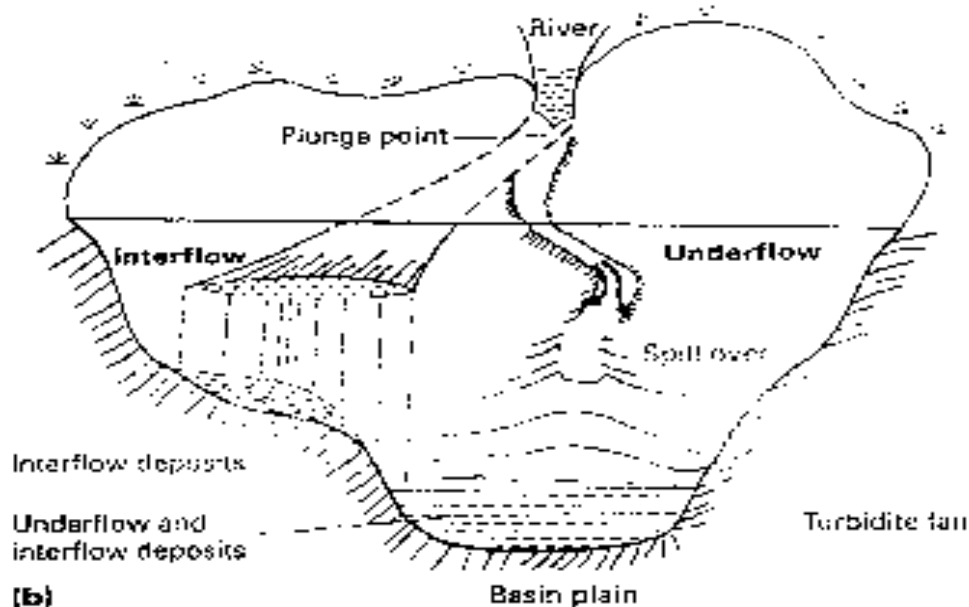
JEZERSKA OKOLJA

Distribucijski mehanizmi in tipi sedimentov za klastično sedimentacijo oligotrofnega jezera z letno termalno stratifikacijo

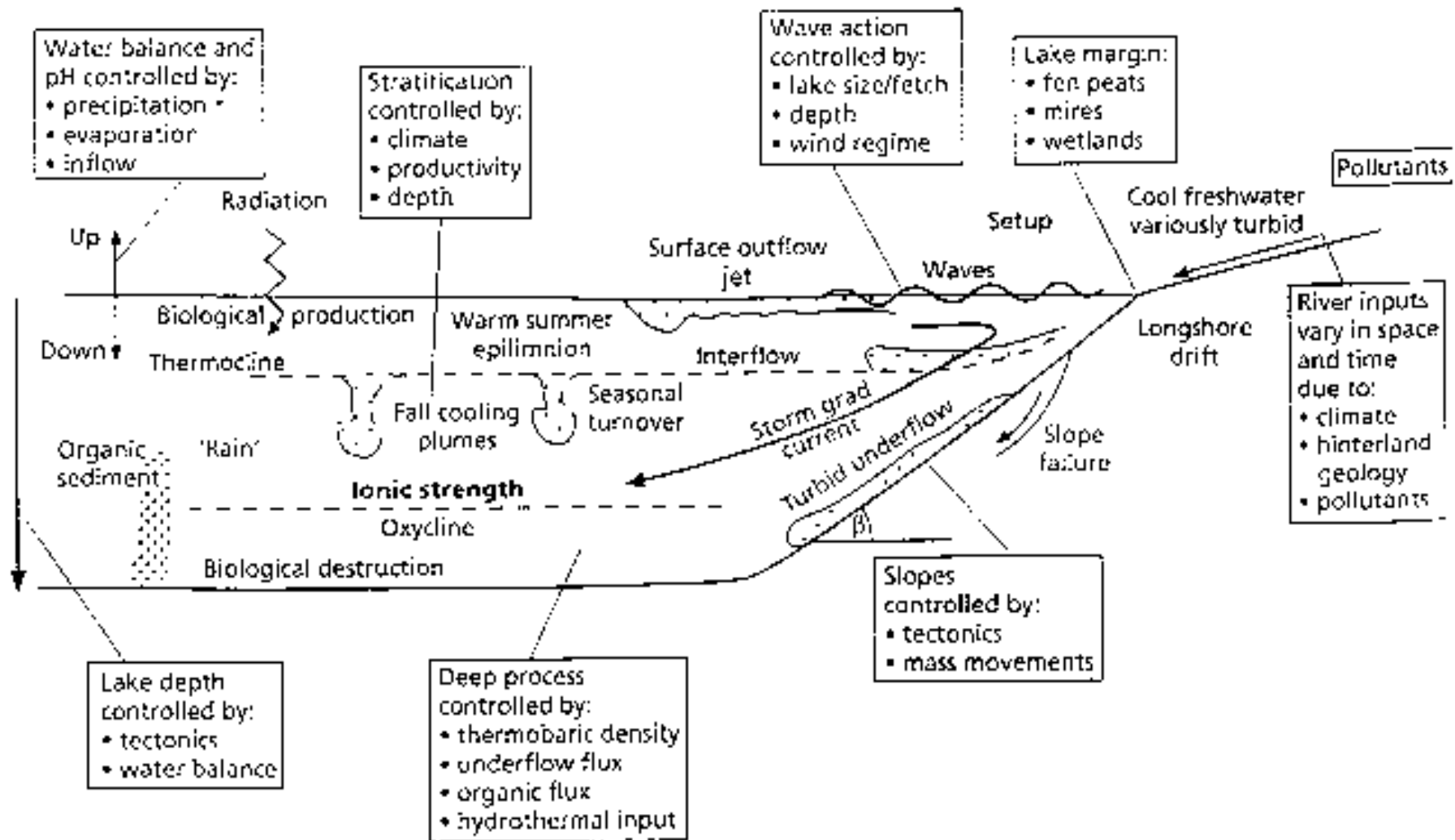
Notranji tokovi - razporeditev sedimentov



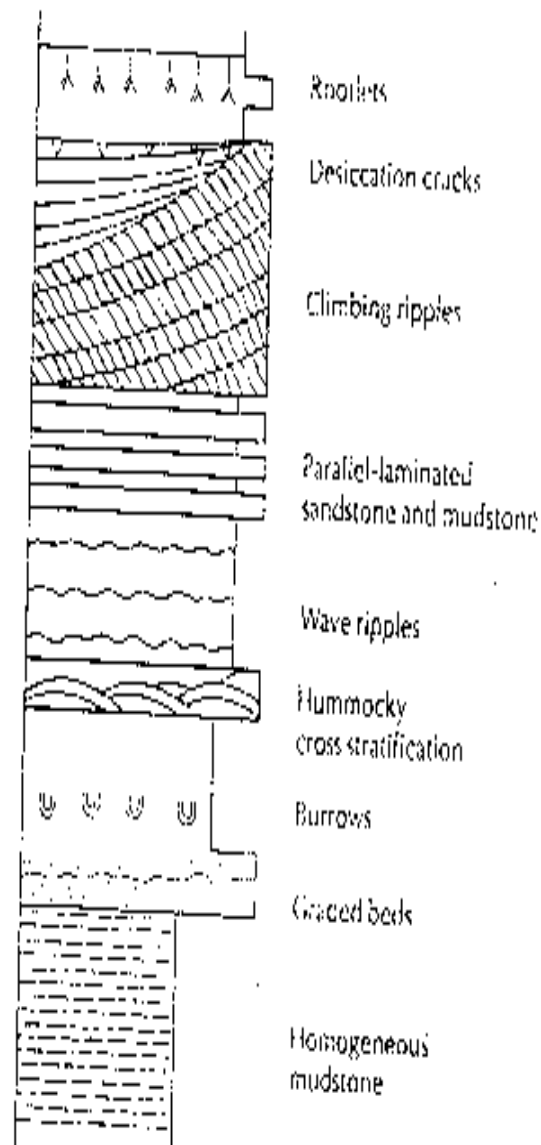
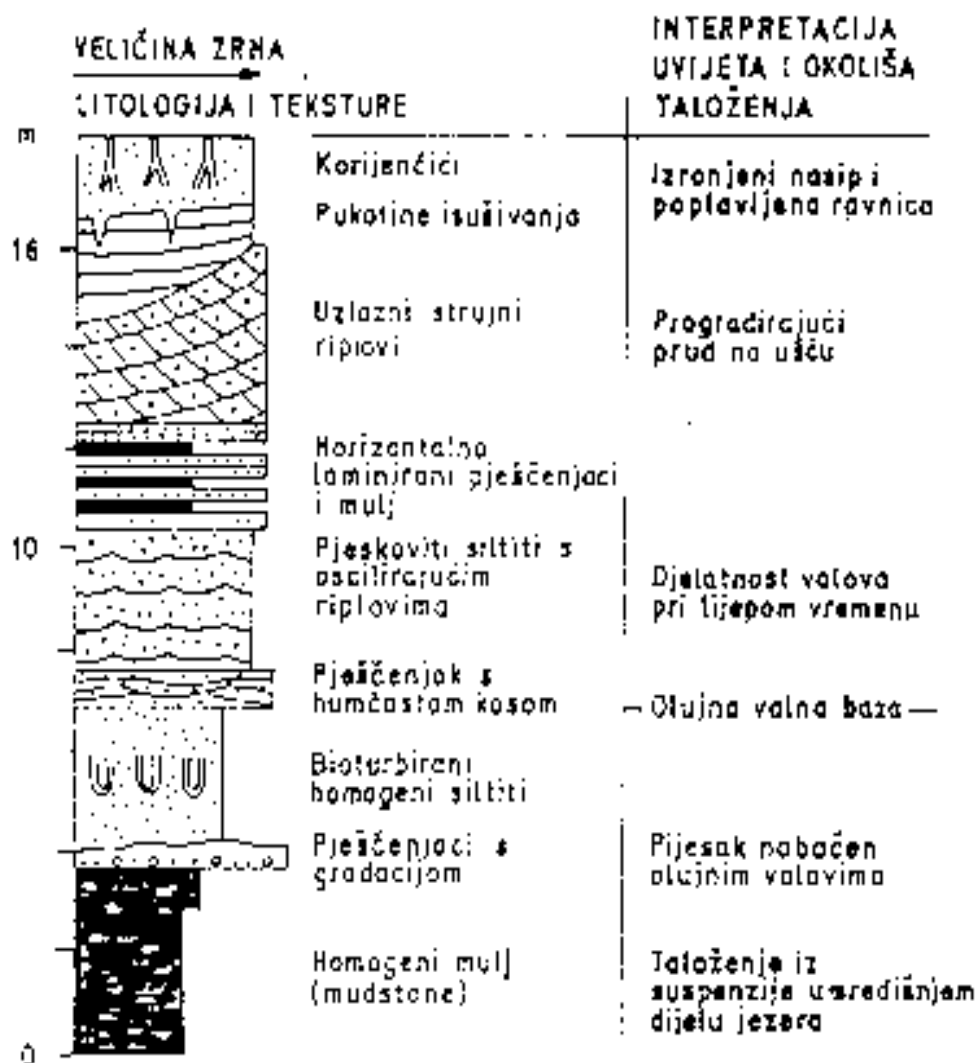
(a)



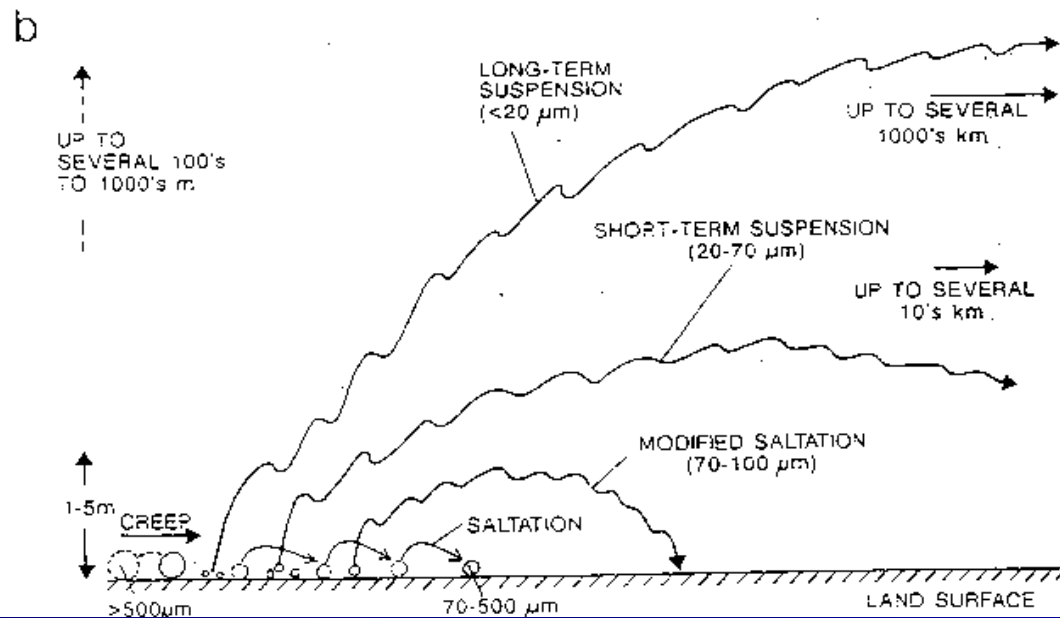
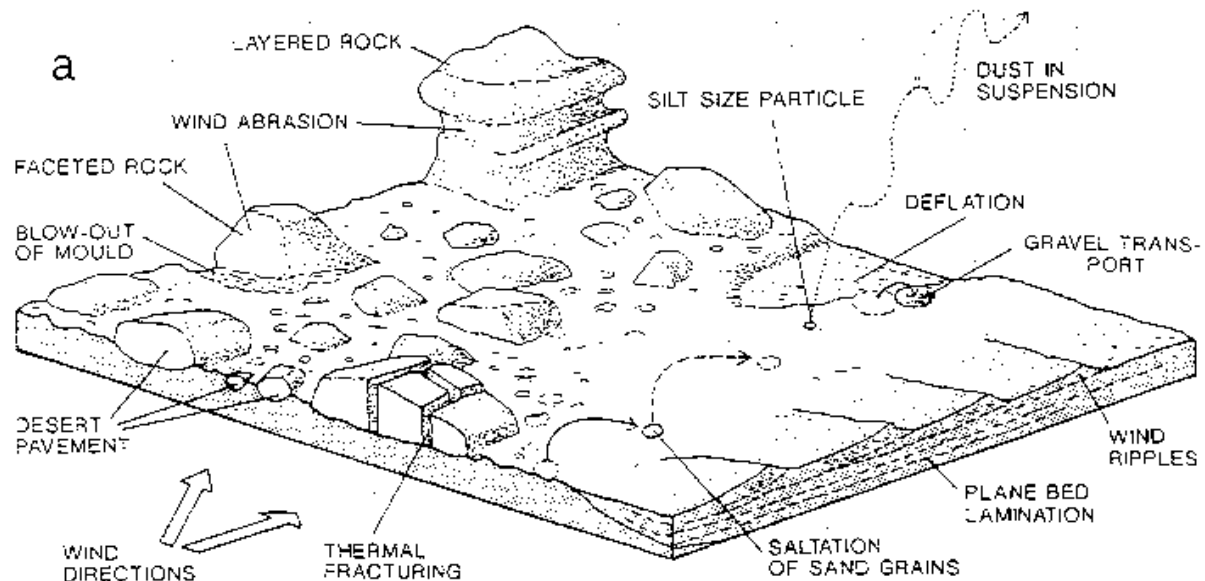
(b)



Idealizirana vertikalna sekvenca nastala z regresijo zaradi rečnega pritoka



Načini transporta glede na velikost zrn



EOLSKA OKOLJA

a

- dine: val. dolž.: nx100 - nx1000 m
višina: nx10 - nx100 m
- megadine = skupina din
- občasni potok (vir peska)
- playa (vir peska, gline, sadre)
- barhani - najmanjše oblike din
- transverzalne dine
- longitudinalne (seif) dine
(v 200-300 m)
- zvezdaste dine
(spreminjajoča smer vetra)

b

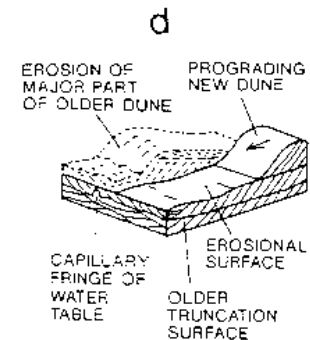
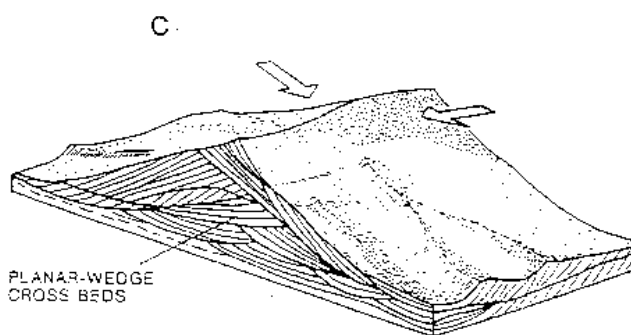
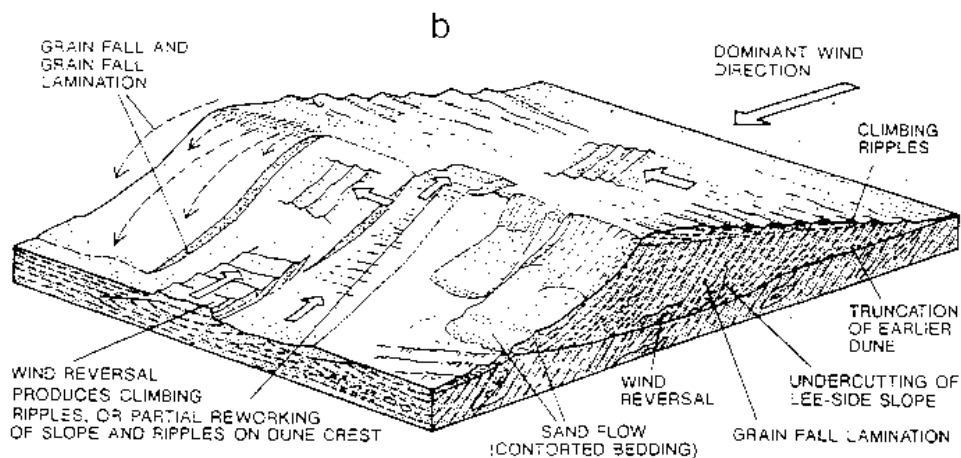
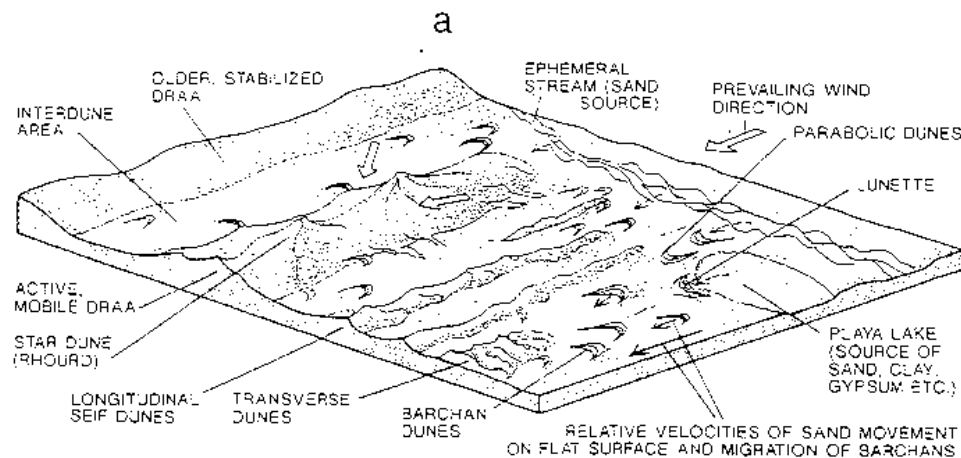
- vzpenjajoče sipinice
- prisekanje starejše dine
- laminacija
- peščeni tok

c

- navzkrižna plastovitost

d

- erozija starejše dine
- napredujoča nova



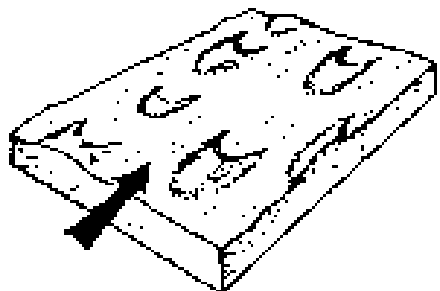


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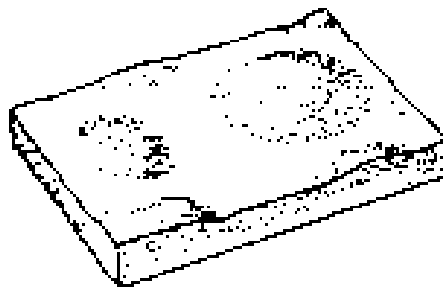


EOLSKA OKOLJA

Morfologija eolskih din glede na smer vetra



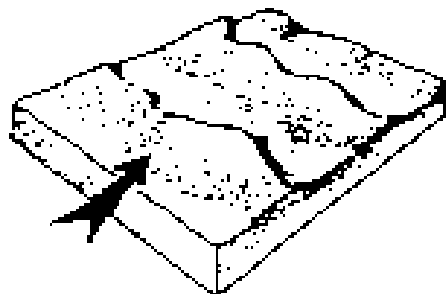
BARHANI



KUPOLASTE (DOVE) DINE



LONGITUDINALNE (SEIF) DINE



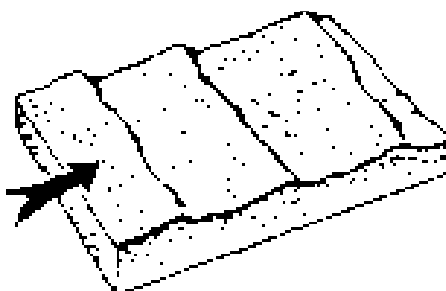
BARHANOIDNI GREBENI



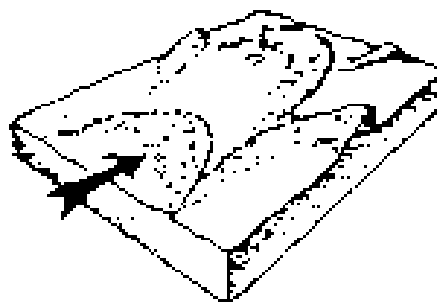
IZPIHANE DINE



ZVEZDASTE DINE



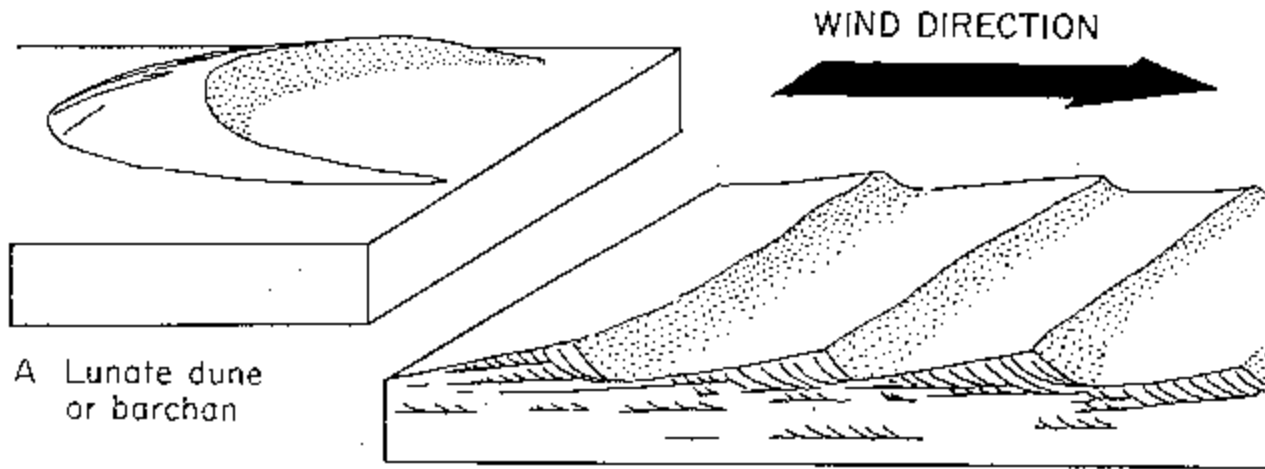
TRANSVERZALNE DINE



PARABOLIČNE DINE

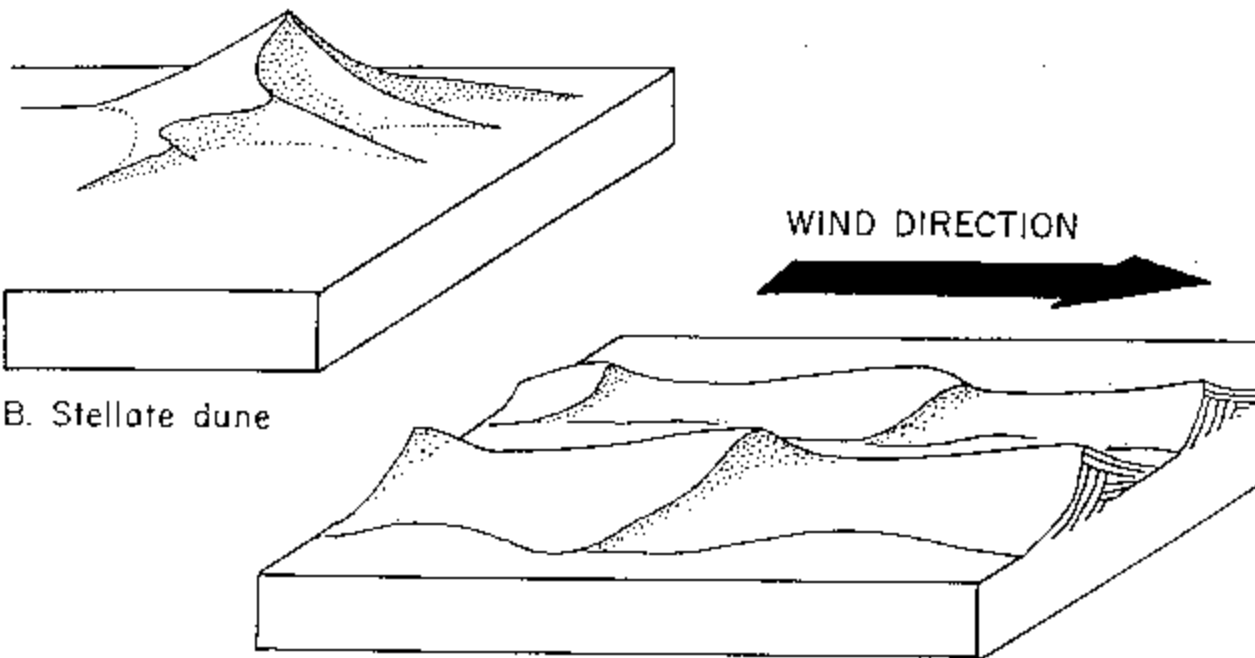


NASPROTNE DINE



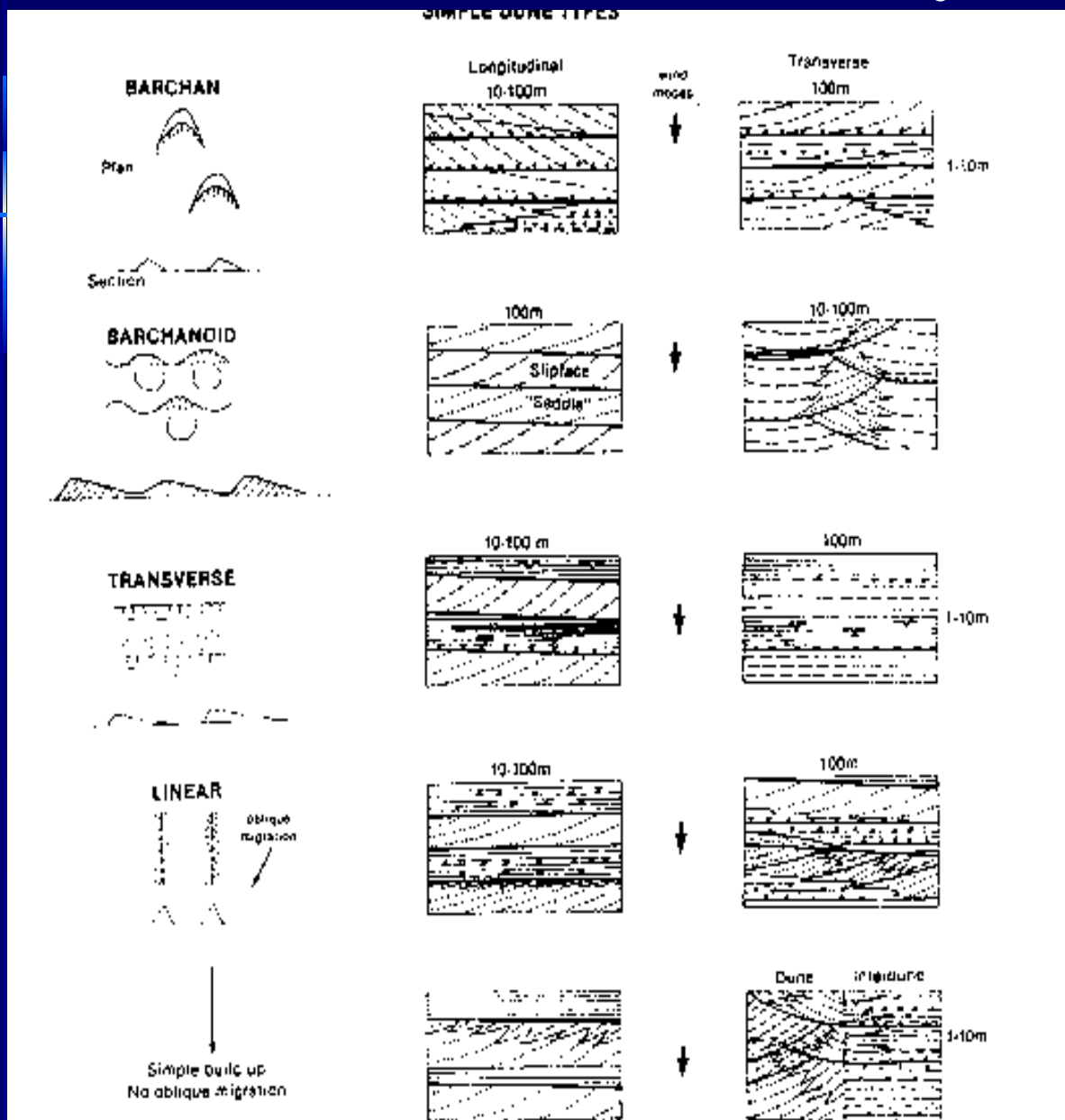
A. Lunate dune or barchan

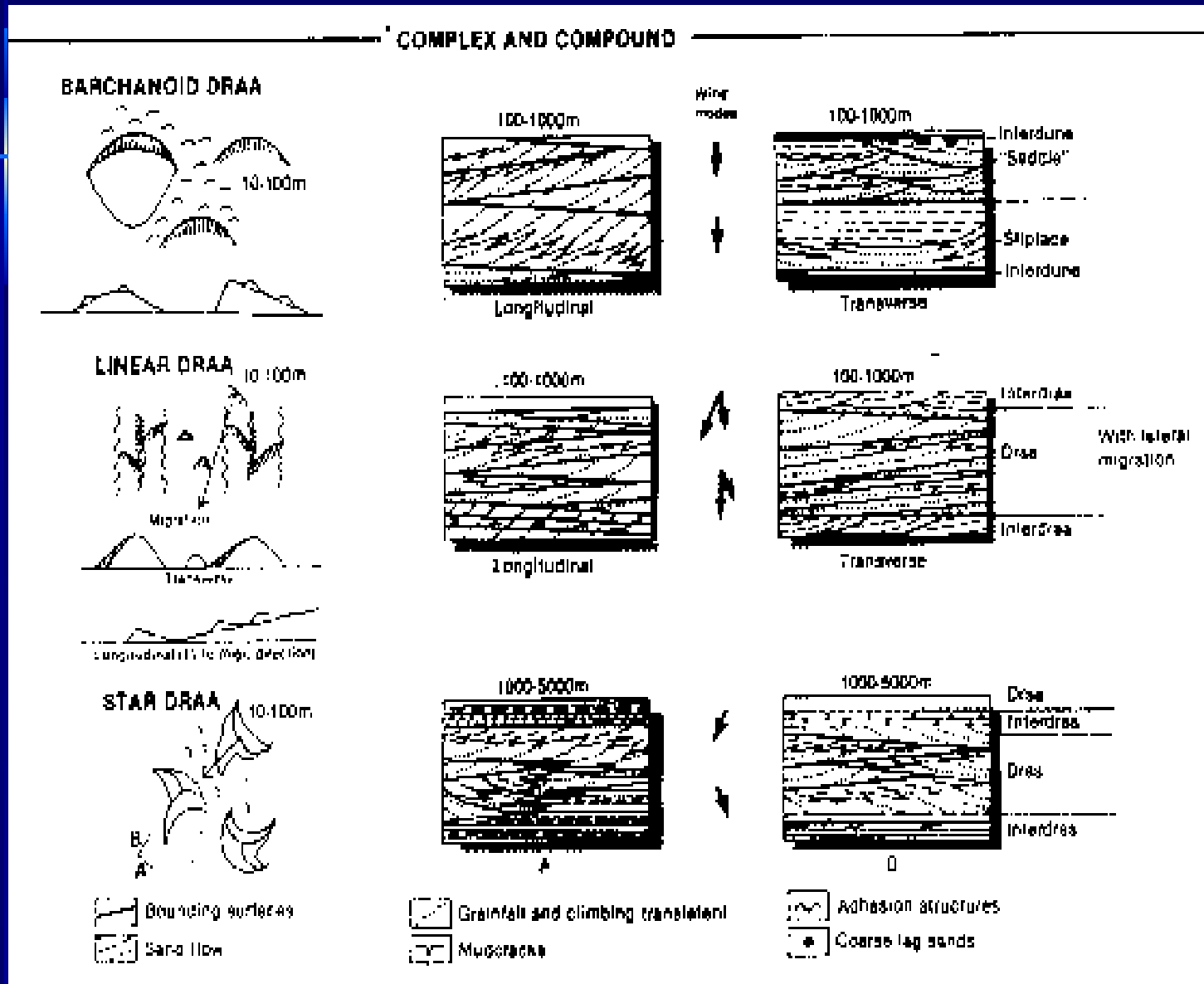
D. Transverse dune



B. Stellate dune

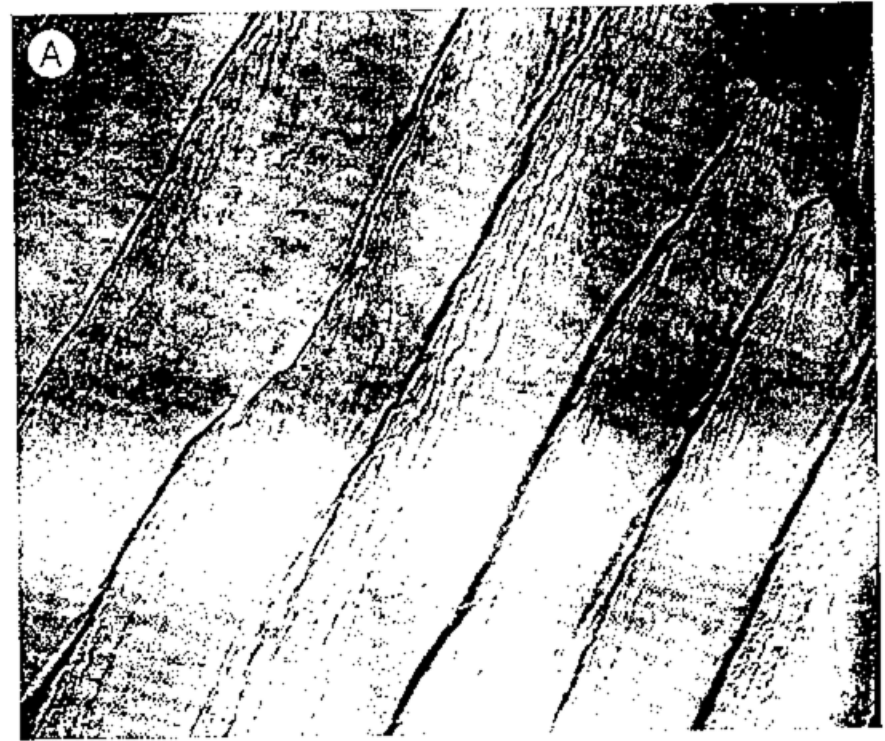
C. Seif or longitudinal dune



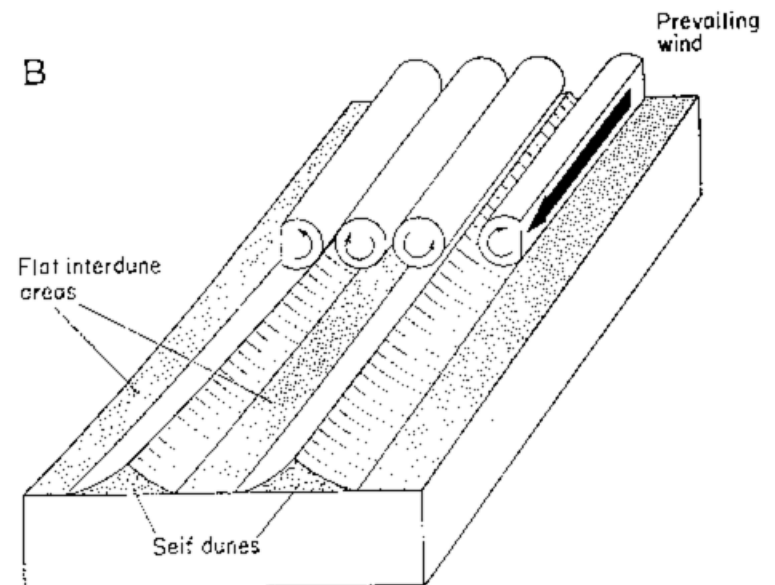


EOLSKA OKOLJA

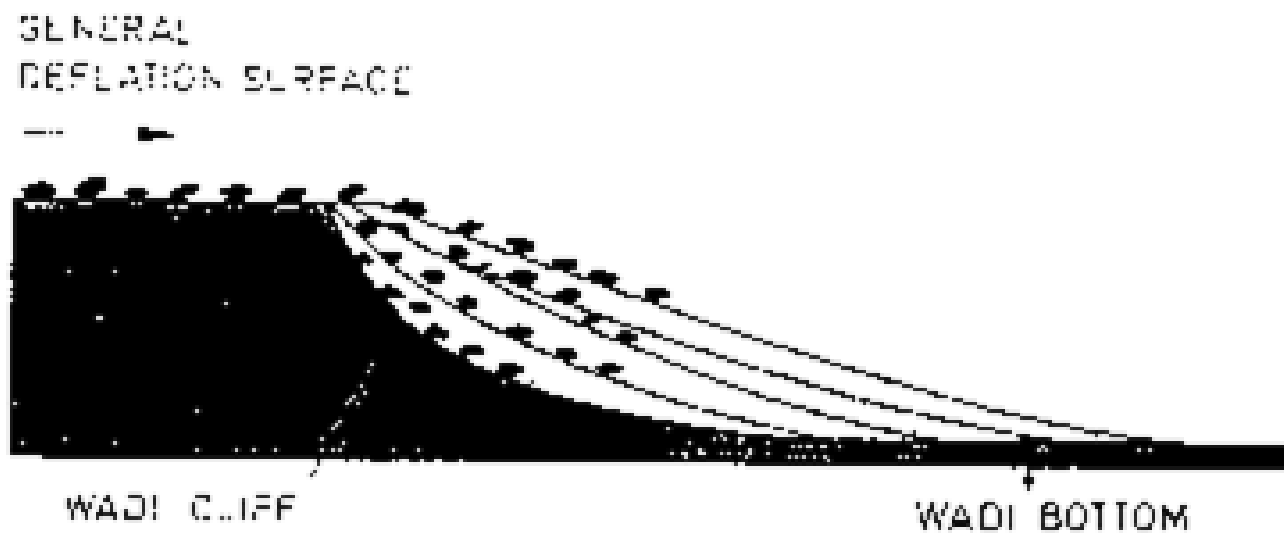
Aero foto posnetek peščenega morja z longitudinalnimi dinami



Ilustracija nastanka longitudinalnih din

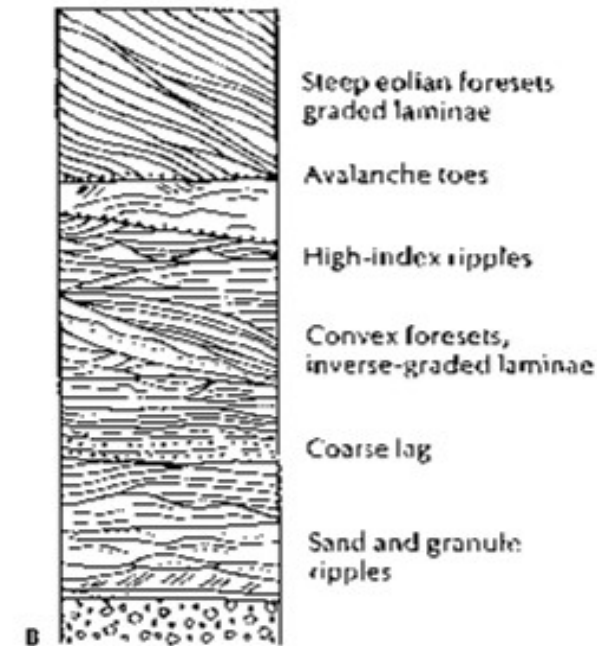
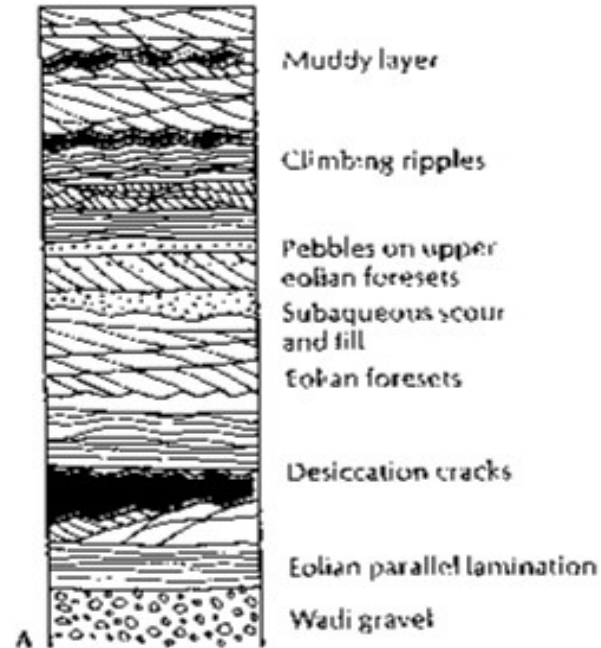


Skica sedimentacije na obrežju puščavskega potoka (wadi)



EOLSKA OKOLJA

Facies eolske
peščene ravnice in
občasnega potoka



Facies eolskih din

- muljaste plasti
- vzpenjajoče sipinice
- prodniki zgornjega eolskega dela (foreset)
- vodno izpiranje in zapolnitve
- eolski napredujoči del (foreset)

- izsušitvene razpoke
- eolska vzporedna laminacija
- wadi prod

- strmo čelo dine (foreset)
gradacija v laminah
- konica zdrsa
- sipinice (visok indeks d/v)

- konveksno čelo; inverzna gradacija v laminah
- debelozrnat sediment

- peščene sipinice



Figura 1. Tabularno planarna navzkrižna plastovitost; Navajo Sandstone, Utah. Foto: Tad Nichols

EOLSKA OKOLJA

Nastanek horizontalnih prisekanih površin
peščenih din

1-akumulacija peščenih din na ravnici
predhodnega nivoja

2-akumulacija in naraščanje gladine

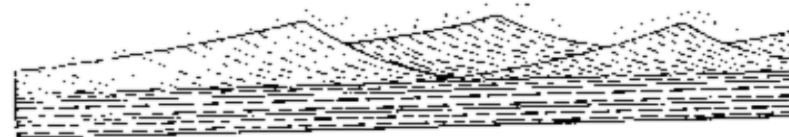
3-veter odnese pesek do nivoja vode

4-drugi nivo din se akumulirajo na površini
nivoja vode

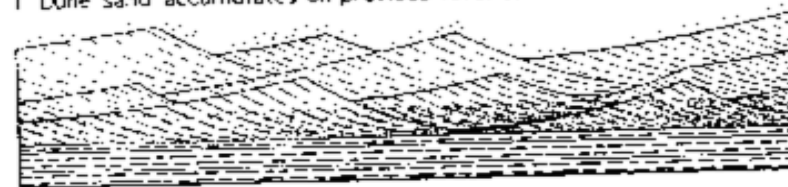
5-dvig gladine

6-vetrna erozija

7-tretji nivo din se akumulira



1 Dune sand accumulates on previous level substratum.



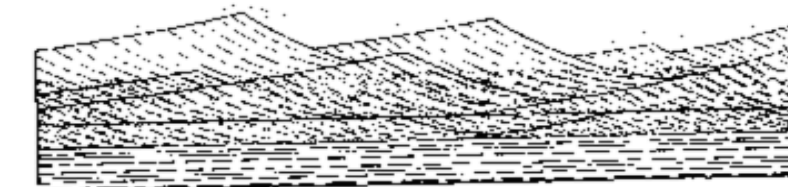
2 Sand accumulation continues, water table rises in sand.



3. Wind action removes sand to water table.



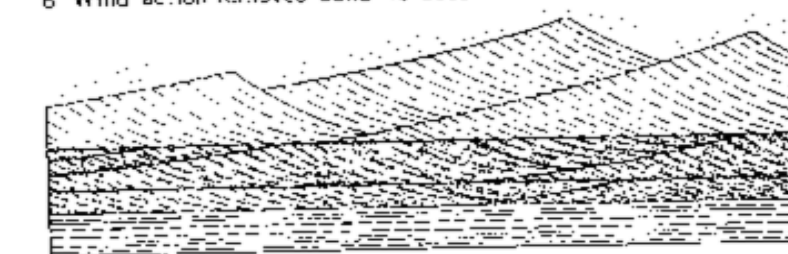
4. Second dune field accumulates on water table surface.

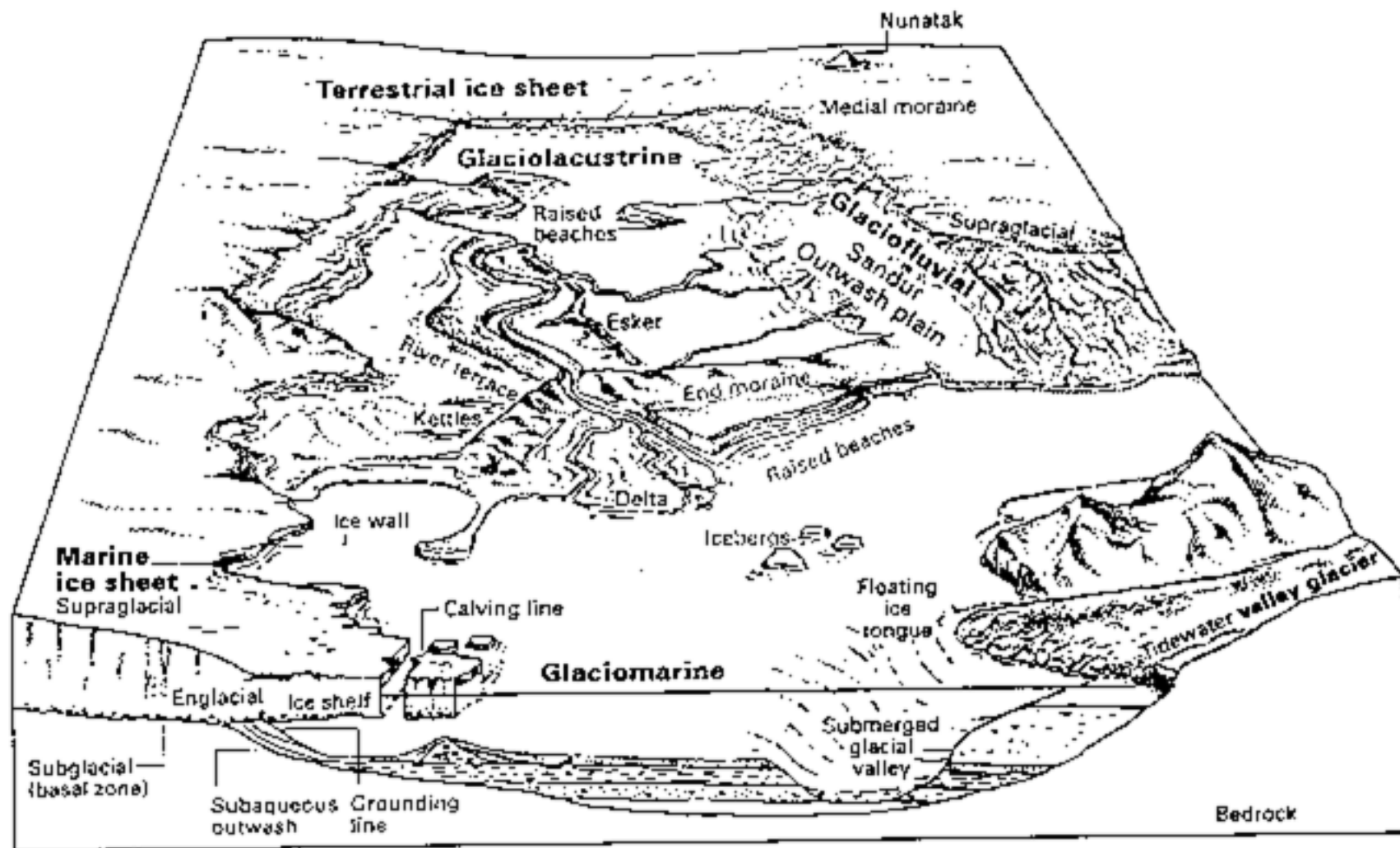


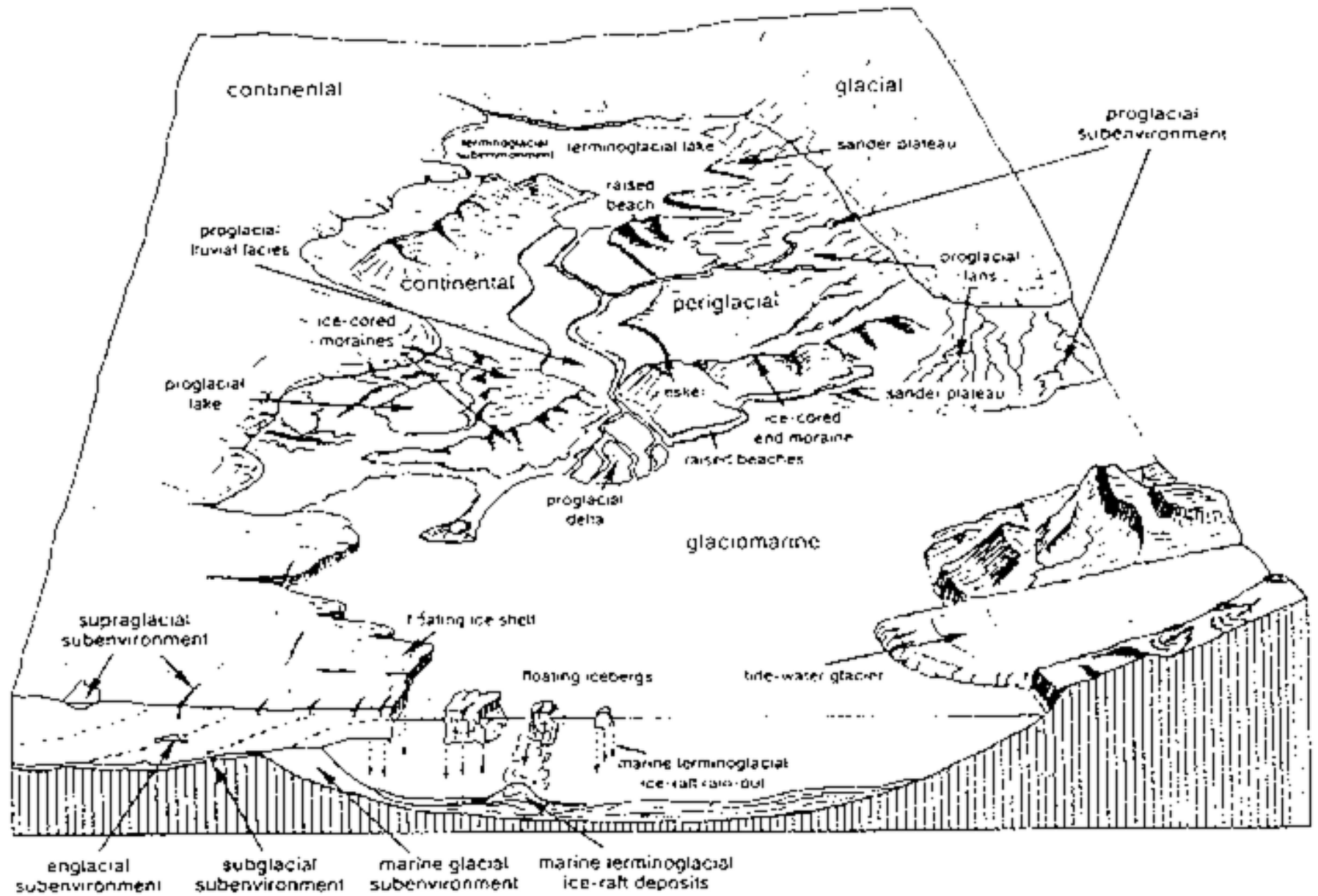
5. Water table rises to new position in dune field.

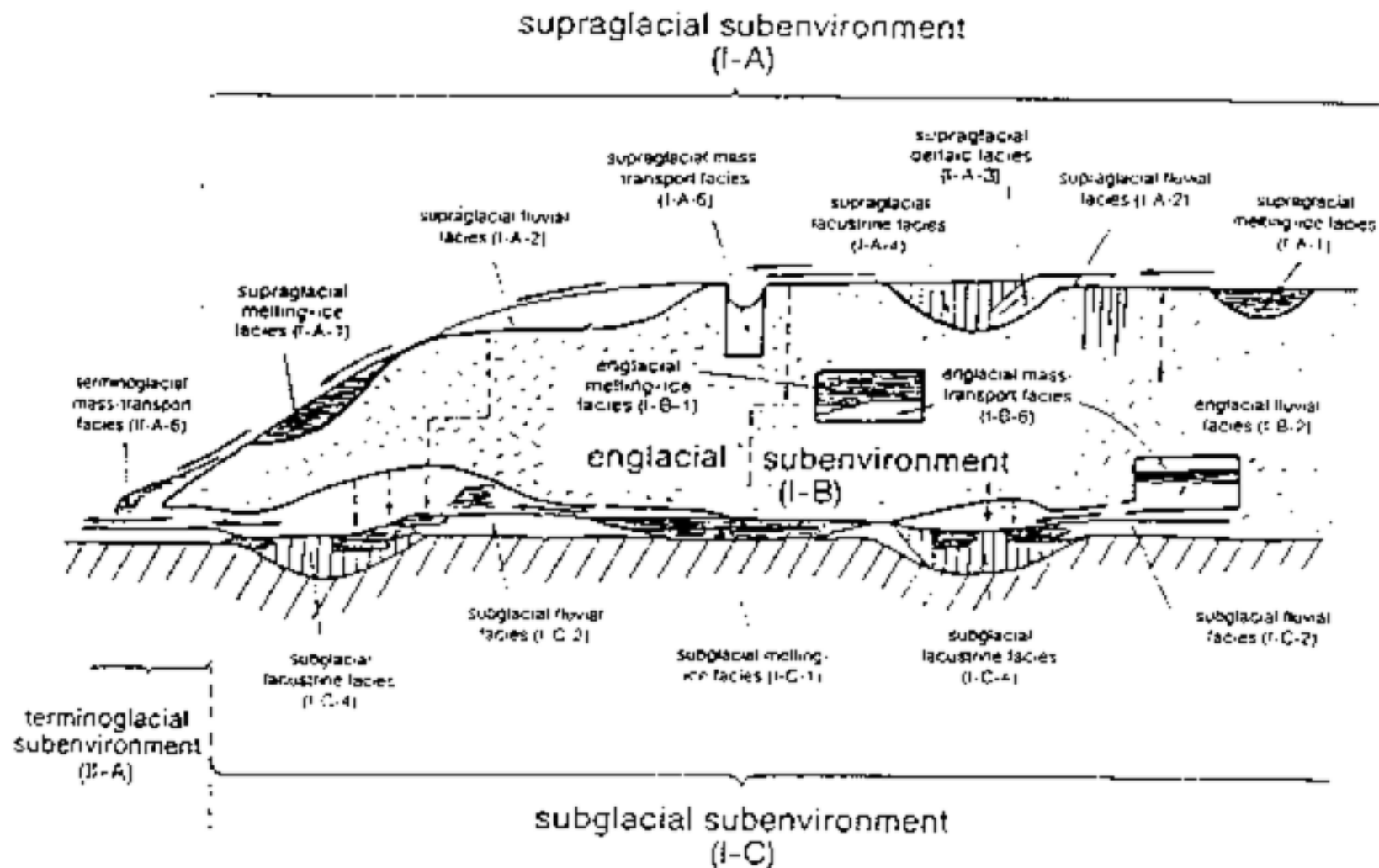


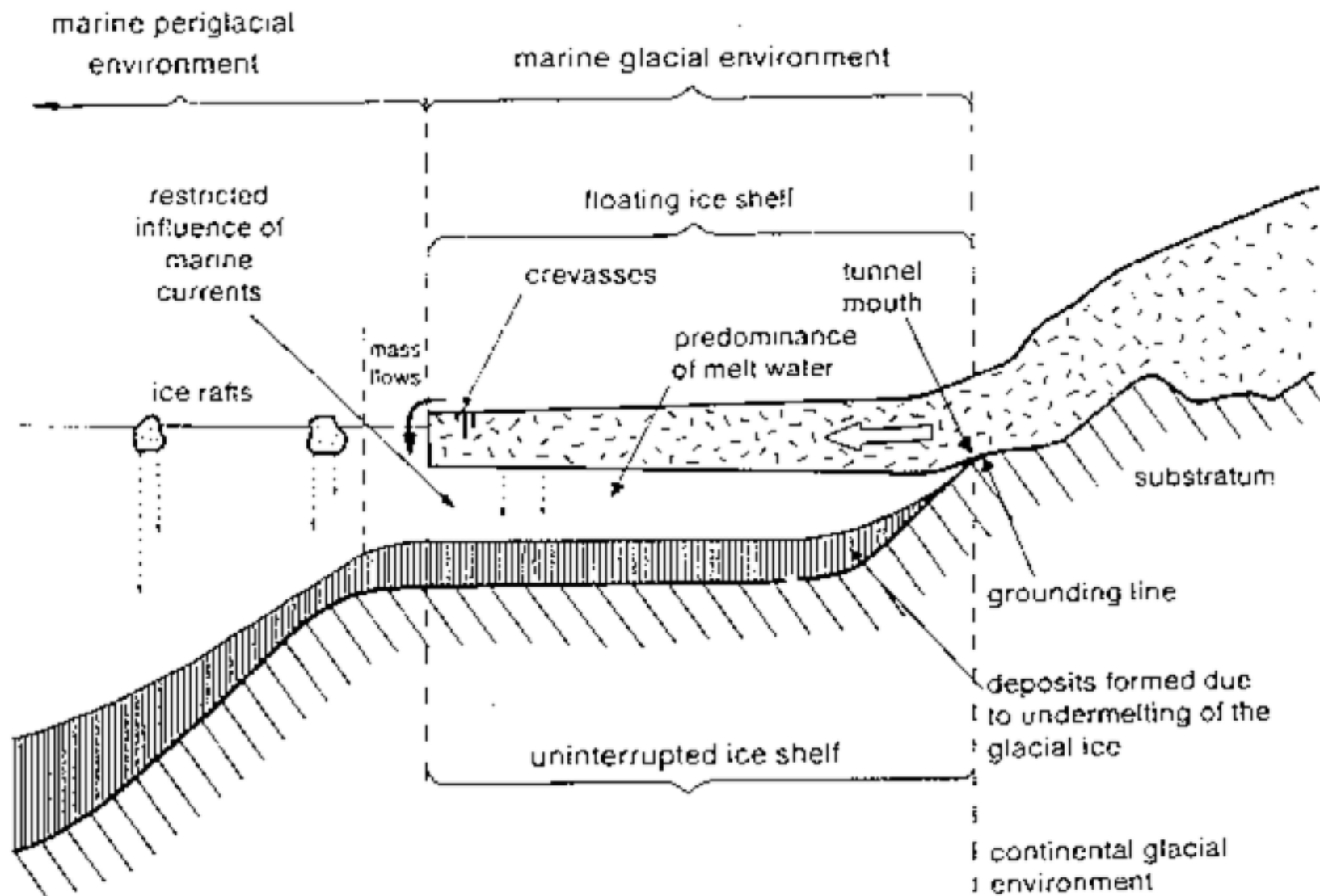
6. Wind action removes sand to second water table

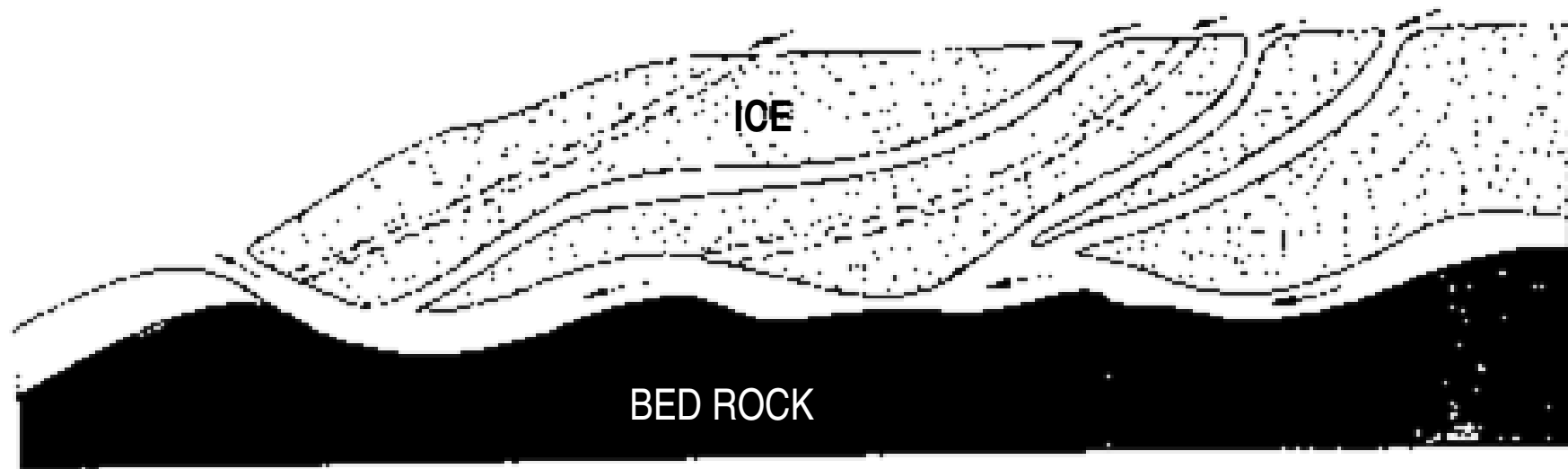






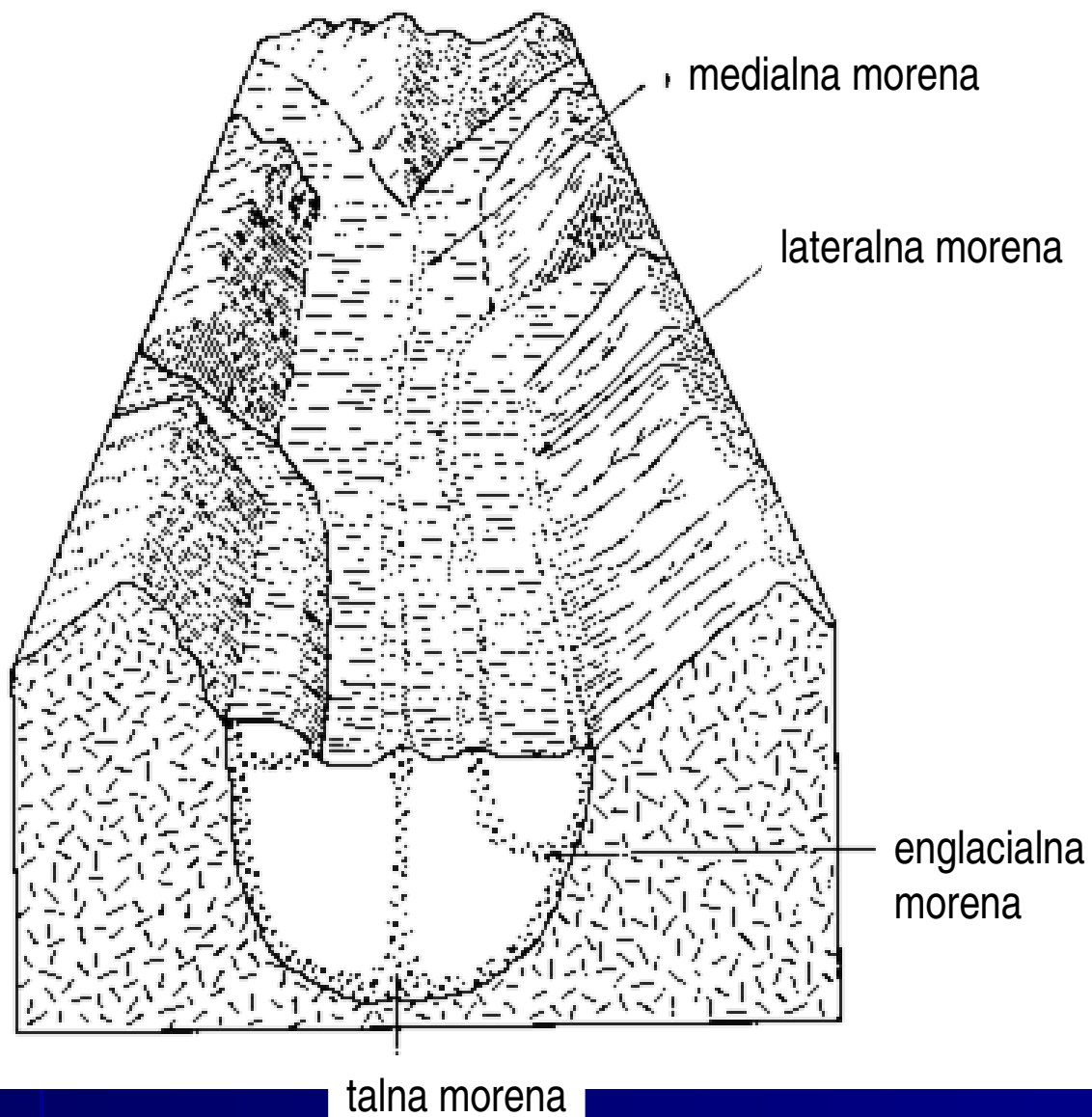






Shematski prikaz tokov voda nastalih s taljenjem

Različni modeli transporta glacialnega materiala

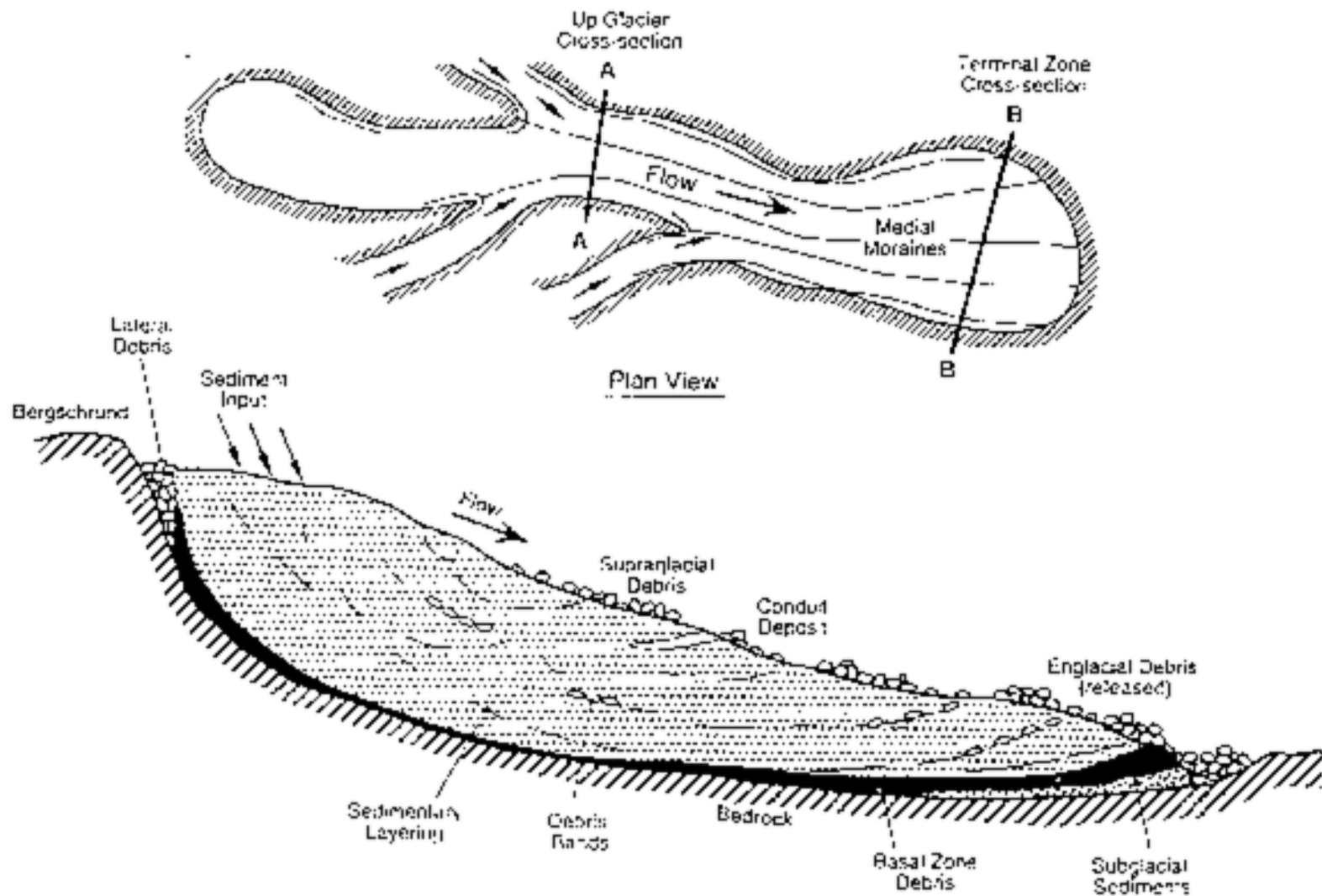


LEDENIŠKA OKOLJA

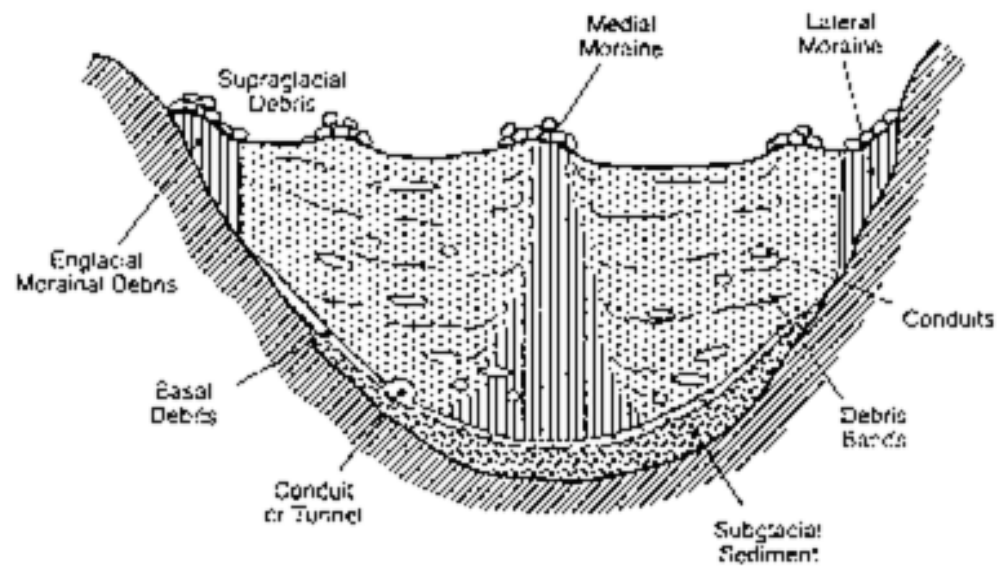


Ledenik, ki se napaja s številnimi stranskimi ledeniškimi pritoki z morenami

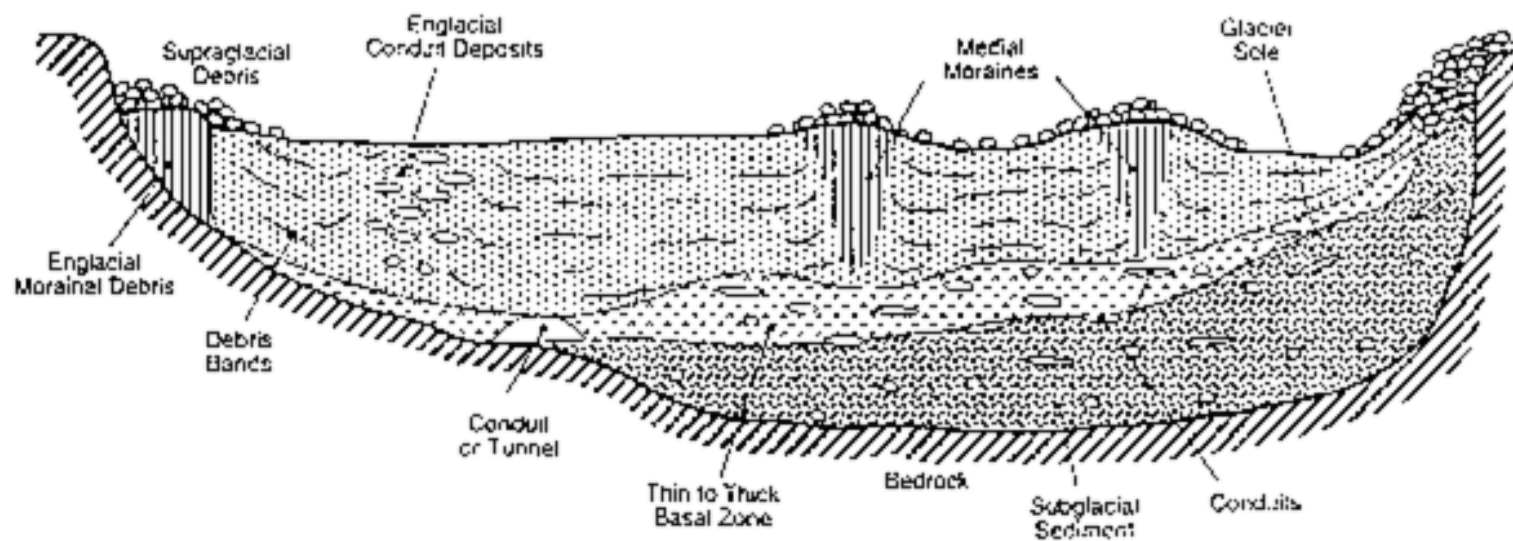
LEDENIŠKA OKOLJA



Razporeditev materiala v idealiziranem dolinskem ledeniku s številnimi pritoki

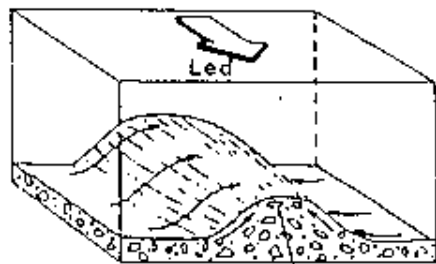


A-A
Up Glacier Cross-section

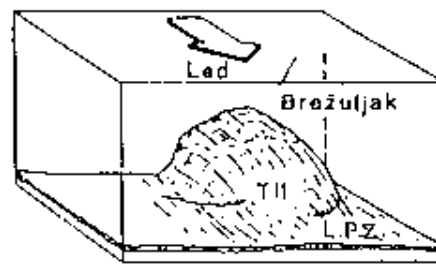


B-B
Terminal Zone Cross-section

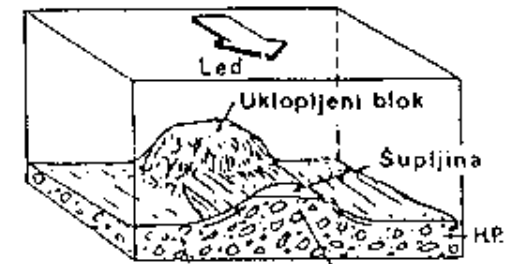
LEDENIŠKA OKOLJA



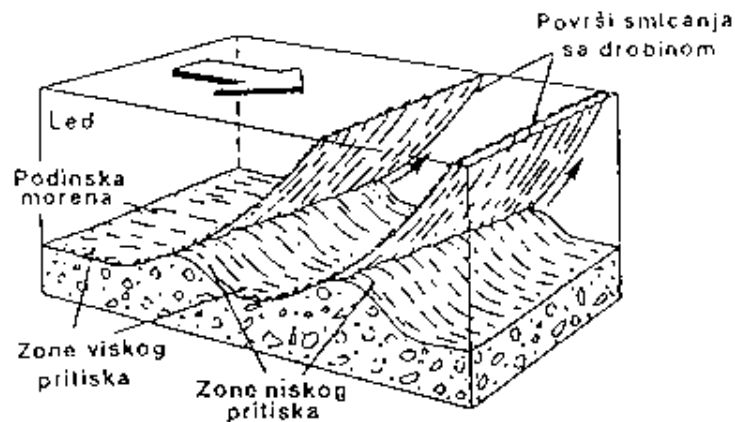
(a) DRUMLIN



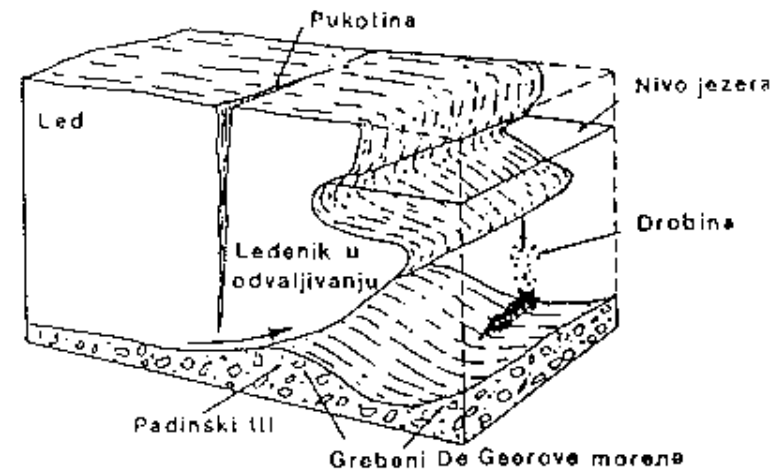
(b) MORENSKE SENKE



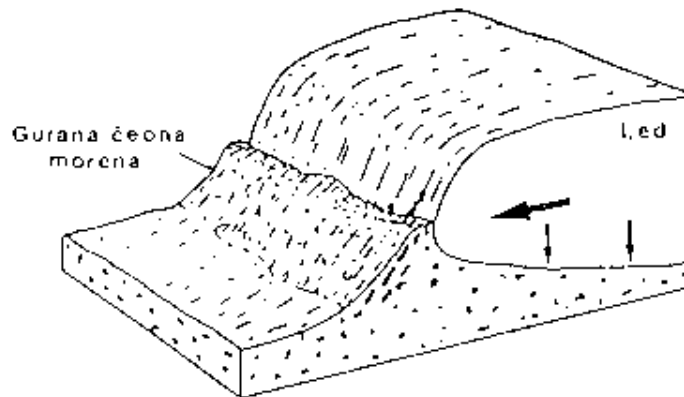
(c) MORENSKI JEZIK



(d) ROGEN-MORENA



(e) DE GEEROVA MORENA



(f) ČEONE MORENE

