SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

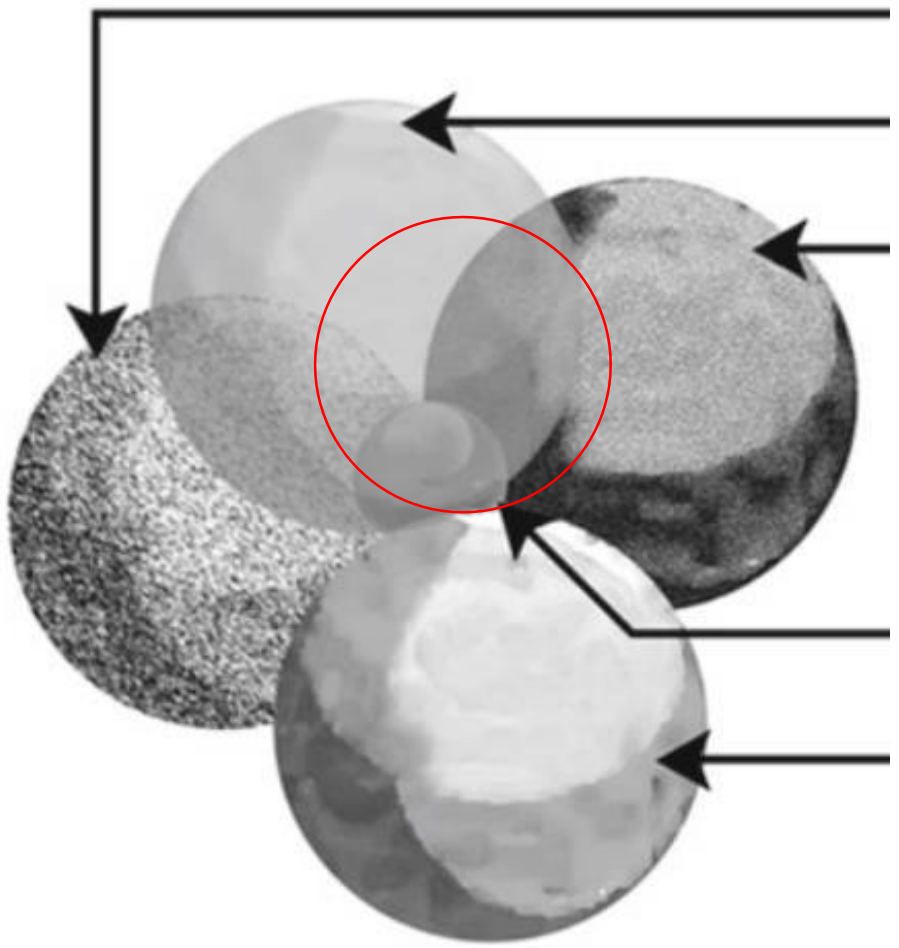
Šumarski fakultet Univerziteta u Sarajevu

Pedologija 2: *Hortikultura(B2424) i Šumarstvo(A2424) (2+2; 30+30)*

Pedologija 2

Doc. dr Emira Hukić

Co-funded by the Erasmus+ Programme of the European Union



Atmosfera

Litosfera

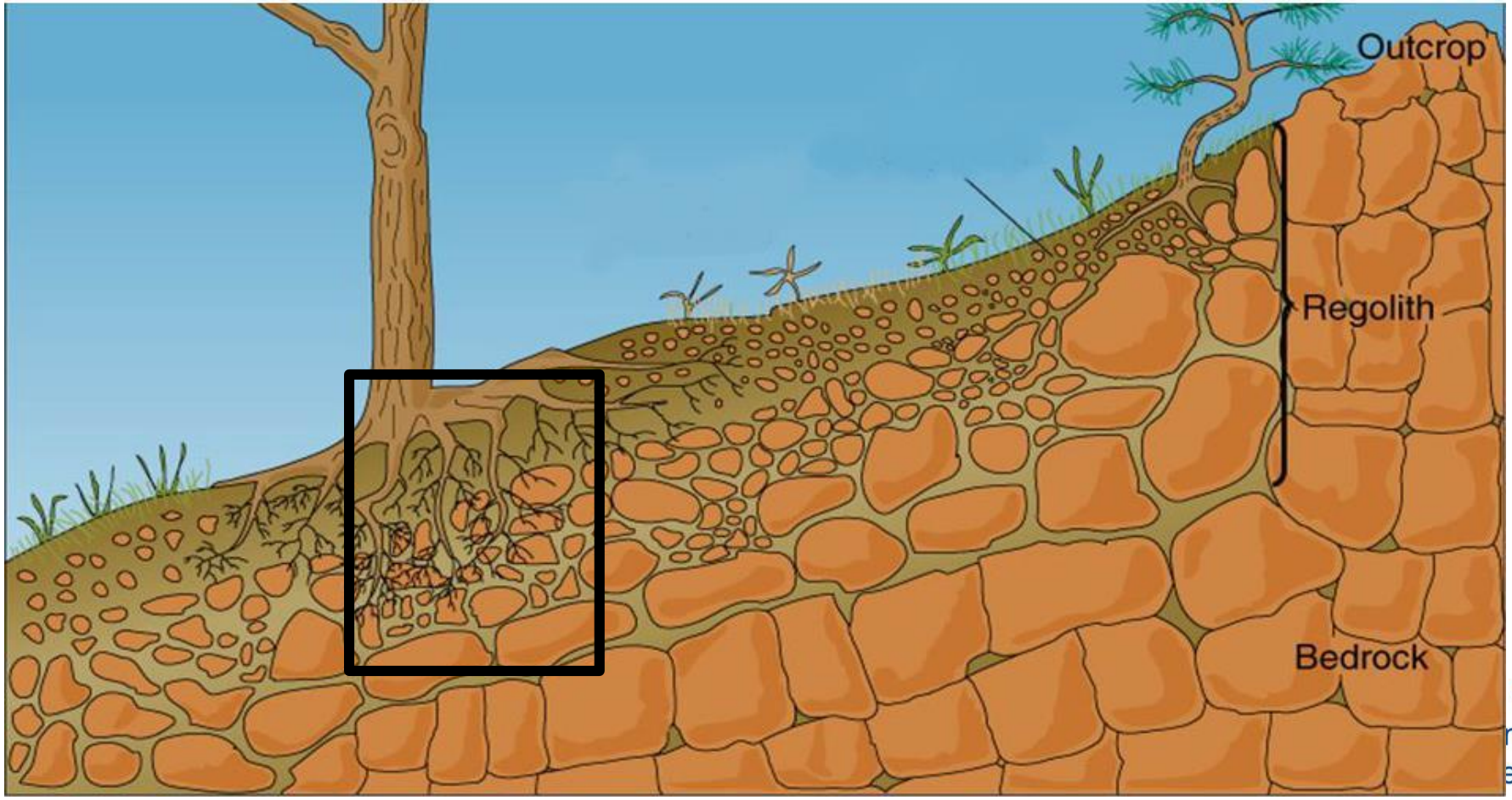
Biosfera

Pedosfera/tlo

Hidrosfera

Co-funded by the Erasmus+ Programme of the European Union

Tlo ili regolit



Co-funded by the
mus+ Programme
e European Union

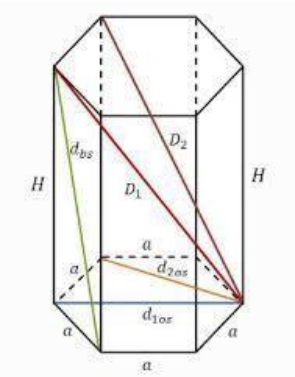
SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Šumarski fakultet Univerziteta u Sarajevu

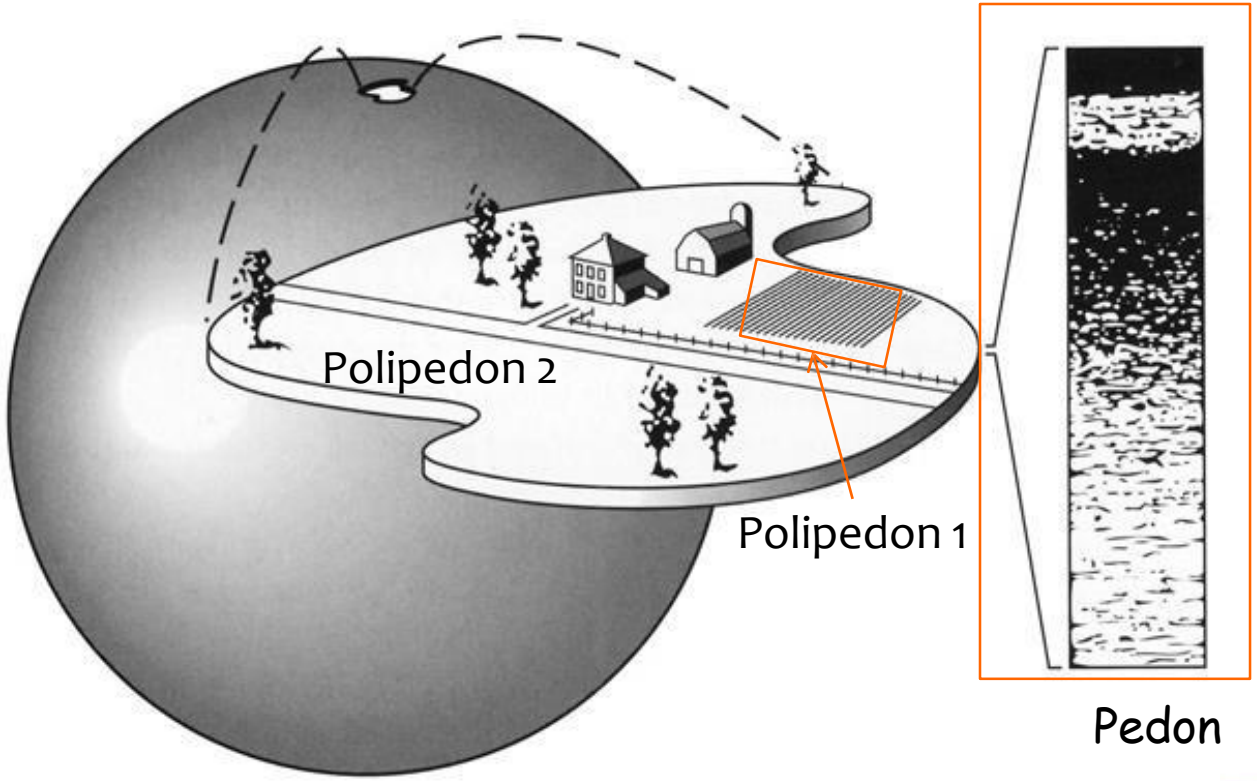
Pedologija 2: *Hortikultura(B2424) i Šumarstvo(A2424) (2+2; 30+30)*

Co-funded by the Erasmus+ Programme of the European Union

- Tlo kao zasebno prirodno-historijsko tijelo za potrebe istraživanja u nauci o tlu je ograničeno dimenzijama.



Slika 1. Pravilna šestostrana prizma



Co-funded by the Erasmus+ Programme of the European Union

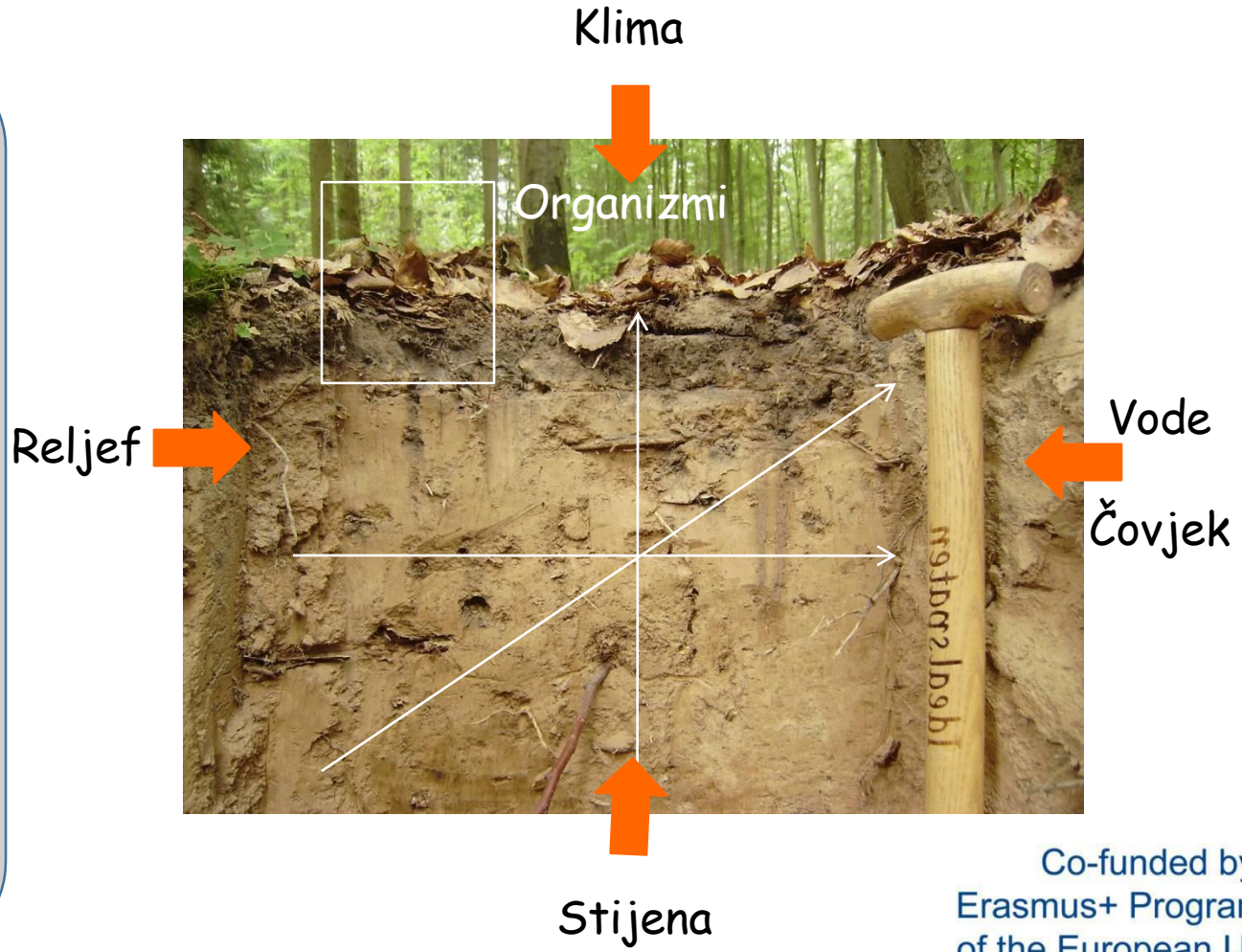
Šumarski fakultet Univerziteta u Sarajevu

Pedologija 2: *Hortikultura(B2424) i Šumarstvo(A2424) (2+2; 30+30)*

nded by the Programme opean Union

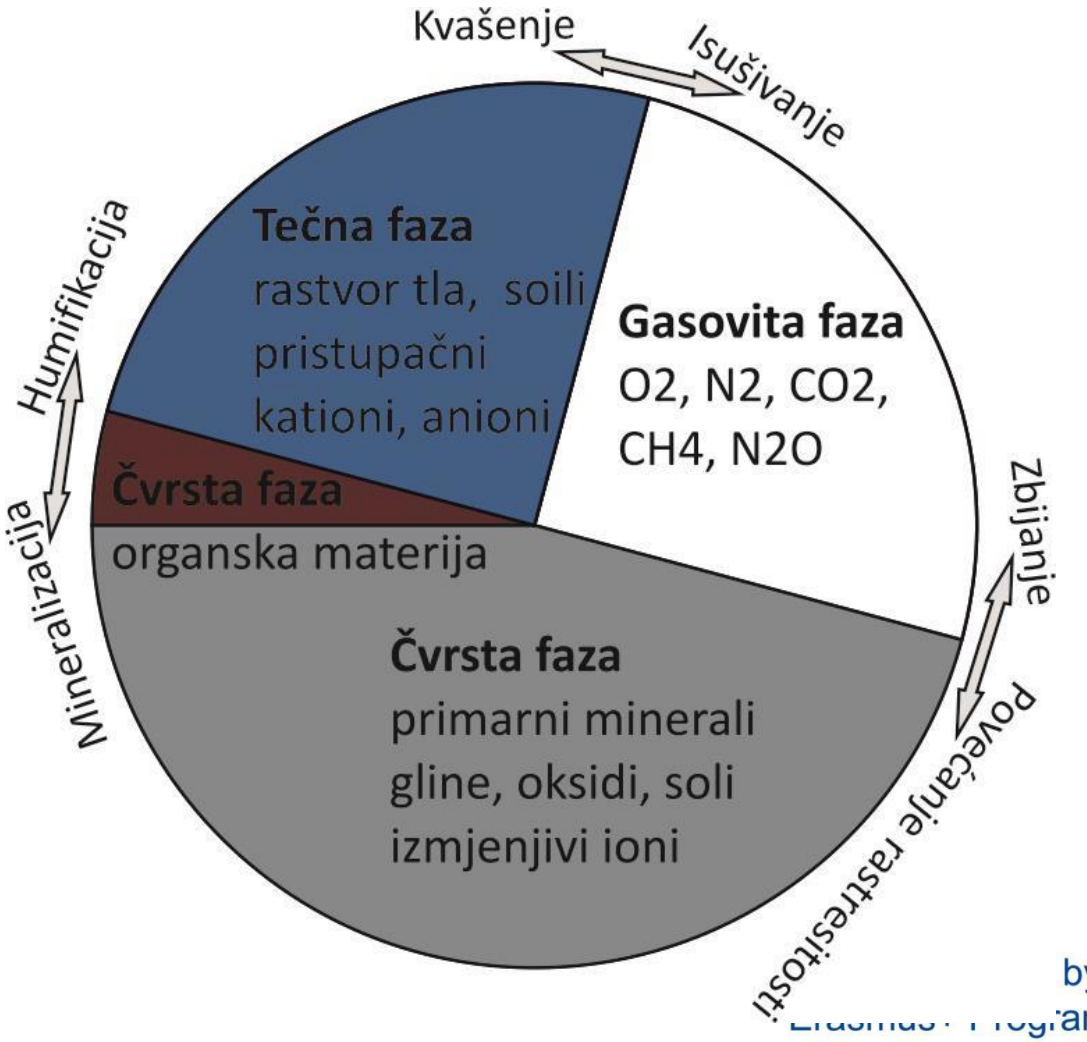
https://study.com/academy/lesson/soil-profile-definition-development-types.html

- Tlo je zasebno prirodno tijelo, koje ne postoji neovisno od ostatka prirode.
- Tlo se odlikuje svojstvom anizotropnosti.
- Tlo posjeduje svojstvo plodnosti.



Co-funded by the Erasmus+ Programme of the European Union

- Tlo je trofaznisistem koga čine čvrsta, tečna i gasovita faza.
- Poželjan odnos je 50 čvrste (5% organske i 45 % mineralne komponente) 25 % tečne i 25 % gasovite faze.



Prijevod shematskog prikaza dijagrama tla (preuzeto s http://vro.depi.vic.gov.au/dpi/vro/vrosite.nsf/pages/soil_health_mis7898_4)

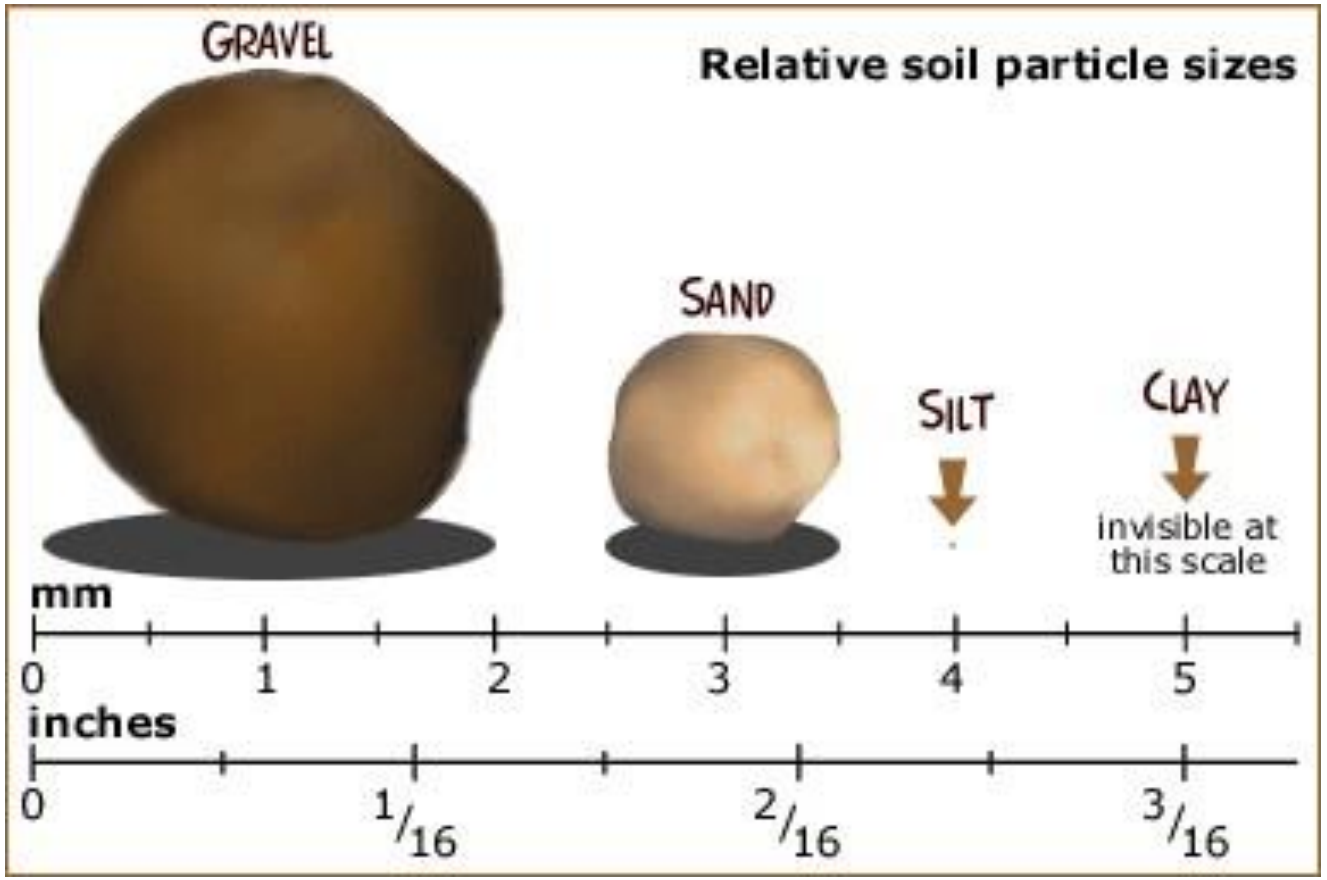
by the Erasmus+ Programme of the European Union

Čvrsta faza: Mineralna komponenta ta

- Čvrste čestice različitih veličina
- Čestice su izgrađene od minerala (primarnih i sekundarnih)
- Odnos čestica daje teksturu tlu
- Čestice su obično slijepljene međusobno i formiraju grudice-agregate

Co-funded by the Erasmus+ Programme of the European Union

Čvrsta faza: Mineralna komponenta

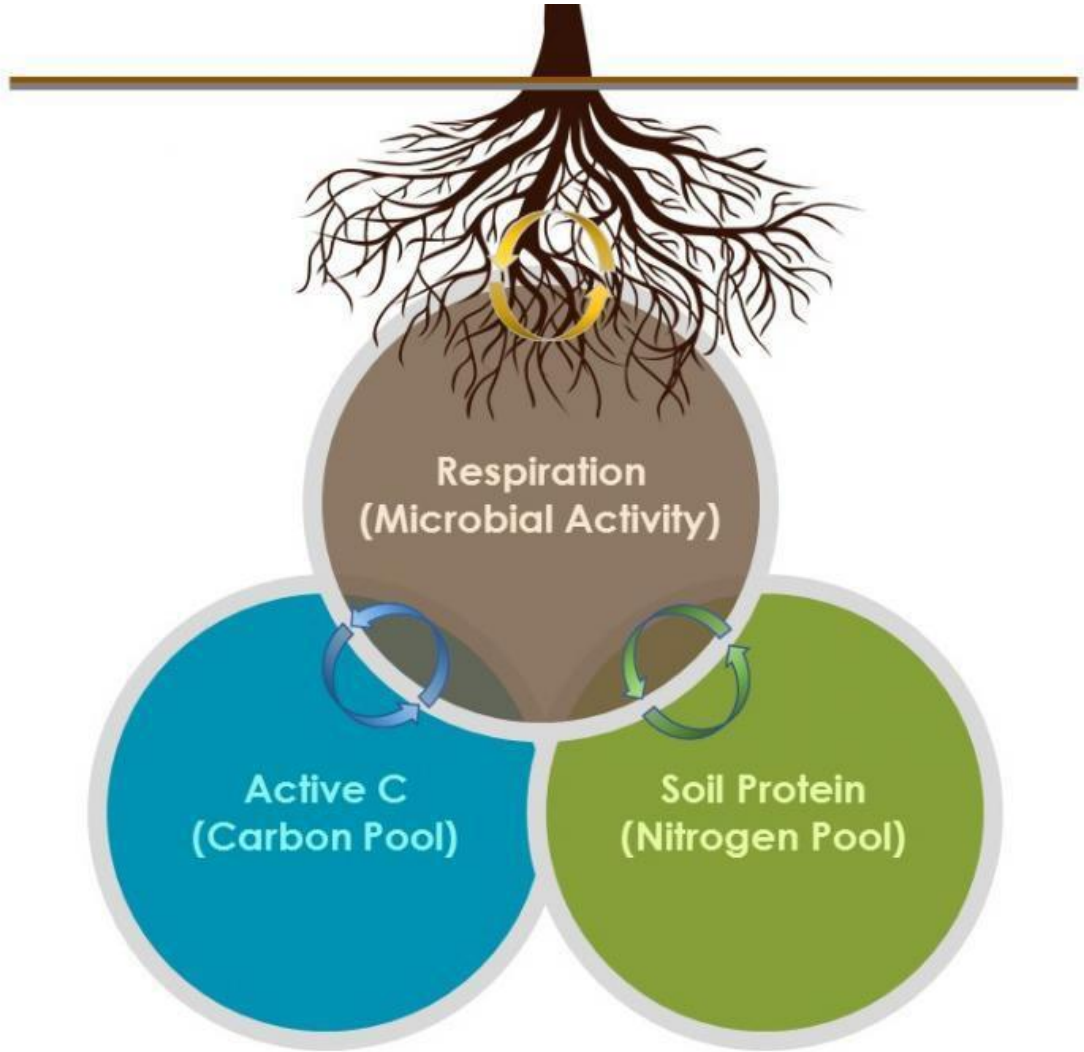


Co-funded by the Erasmus+ Programme of the European Union

Čvrsta faza: Mineralna komponenta

Svojstvo	**Pijesak 2-0.02 mm**	**Prah 0.02-0.002mm**	**Glina <0.002**
Način promatranja	Golim okom	Mikroskop	Elektronski mikroskop
Dominantni minerali	Primarni	Primarni i sekundarni	Sekundarni
Međusobno privlačenje čestica	Malo	Srednje	Veliko
Privlačenje vode	Malo	Srednje	Veliko
Mogućnost čuvanja hraniva	Veoma malo	Srednje	Veliko
Konzistencija mokrog tla	Rasipa se, šljunkovito	Glatko	Ljepljivo, plastično
Konzistencija suhog tla	Veoma sklono rasipanju, šljunkovito	Puderkasto, grudve	Veoma tvrdi grumen

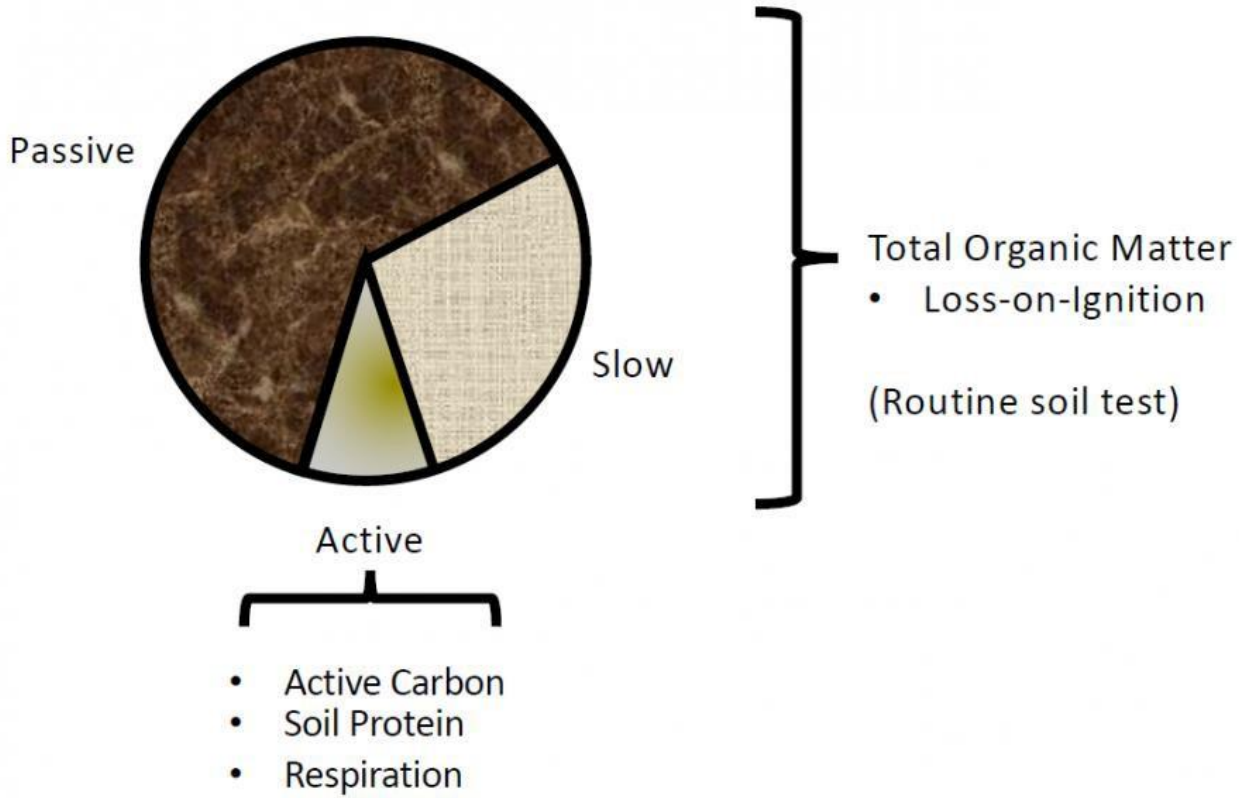
Co-funded by the Erasmus+ Programme of the European Union



https://soilfertility.osu.edu/extension-and-outreach/soil-health-testing

he
Erasmus+ Programme
of the European Union

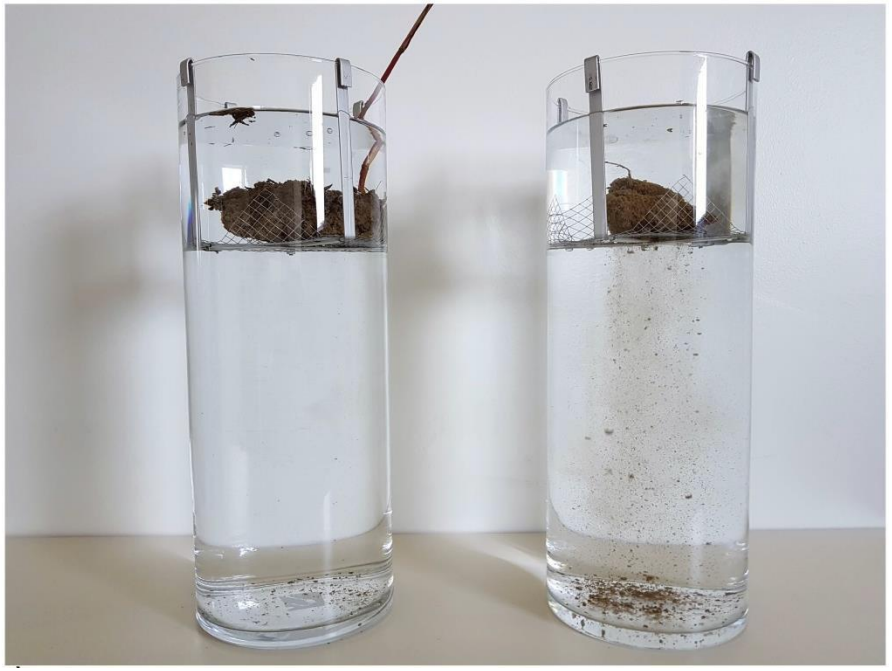
https://soilfertility.osu.edu/extension-and-outreach/soil-health-testing

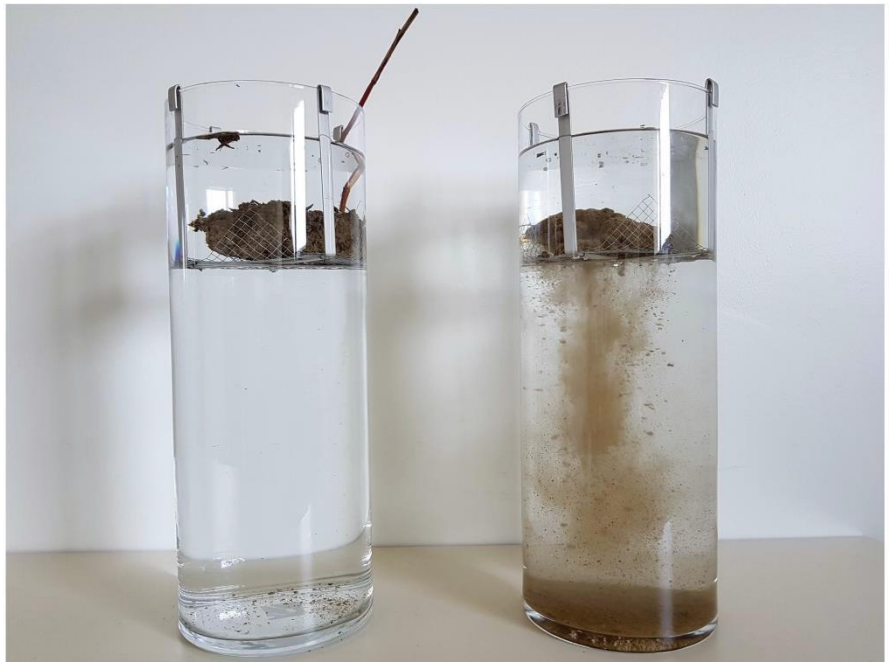


Co-funded by the
Erasmus+ Programme
of the European Union

Šumarski fakultet Univerziteta u Sarajevu

Pedologija 2: *Hortikultura(B2424) i Šumarstvo(A2424) (2+2; 30+30)*



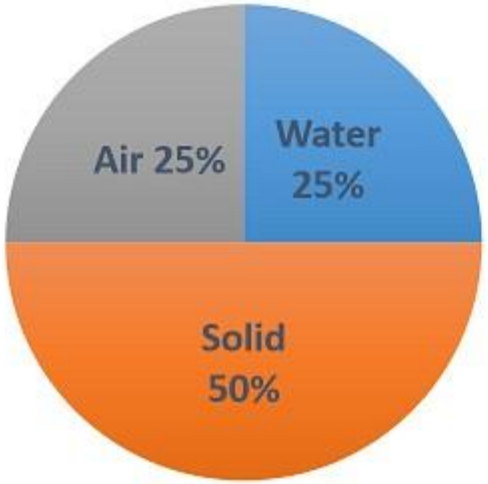


Co-funded by the Erasmus+ Programme of the European Union

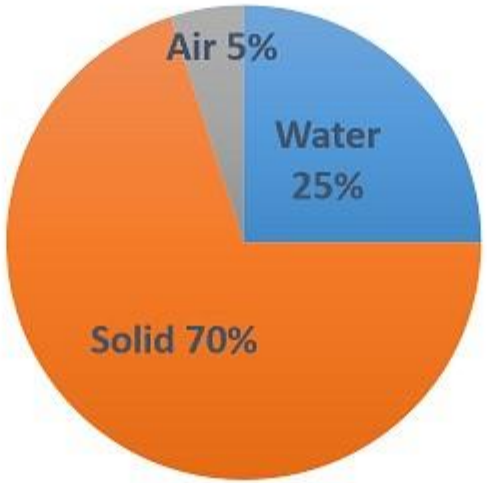
Koriste se u relativno velikim koncentracijama		Koriste se u relativno malim koncentracijama
Uglavnom iz zraka i vode	Od čvrstih dijelova tla-čestice tla	Od čvrstih dijelova tla-čestice tla
Ugljik (C) Hidrogen (H) Oksigen (O)	Azot (N) Fosfor (F) Kalij (K) Kalcijum (Ca) Magnezijum (Mg) Sumpor (S)	Željezo (Fe) Mangan (Mn) Bor (B) Molibden (Mo) Bakar (Cu) Cink (Zn) Hlor (Cl) Kobalt (Co)

Co-funded by the Erasmus+ Programme of the European Union

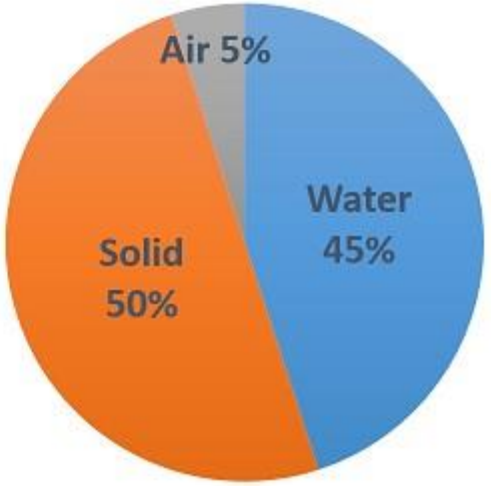
Tečna i gasovita faza



Dobri uslovi u tlu



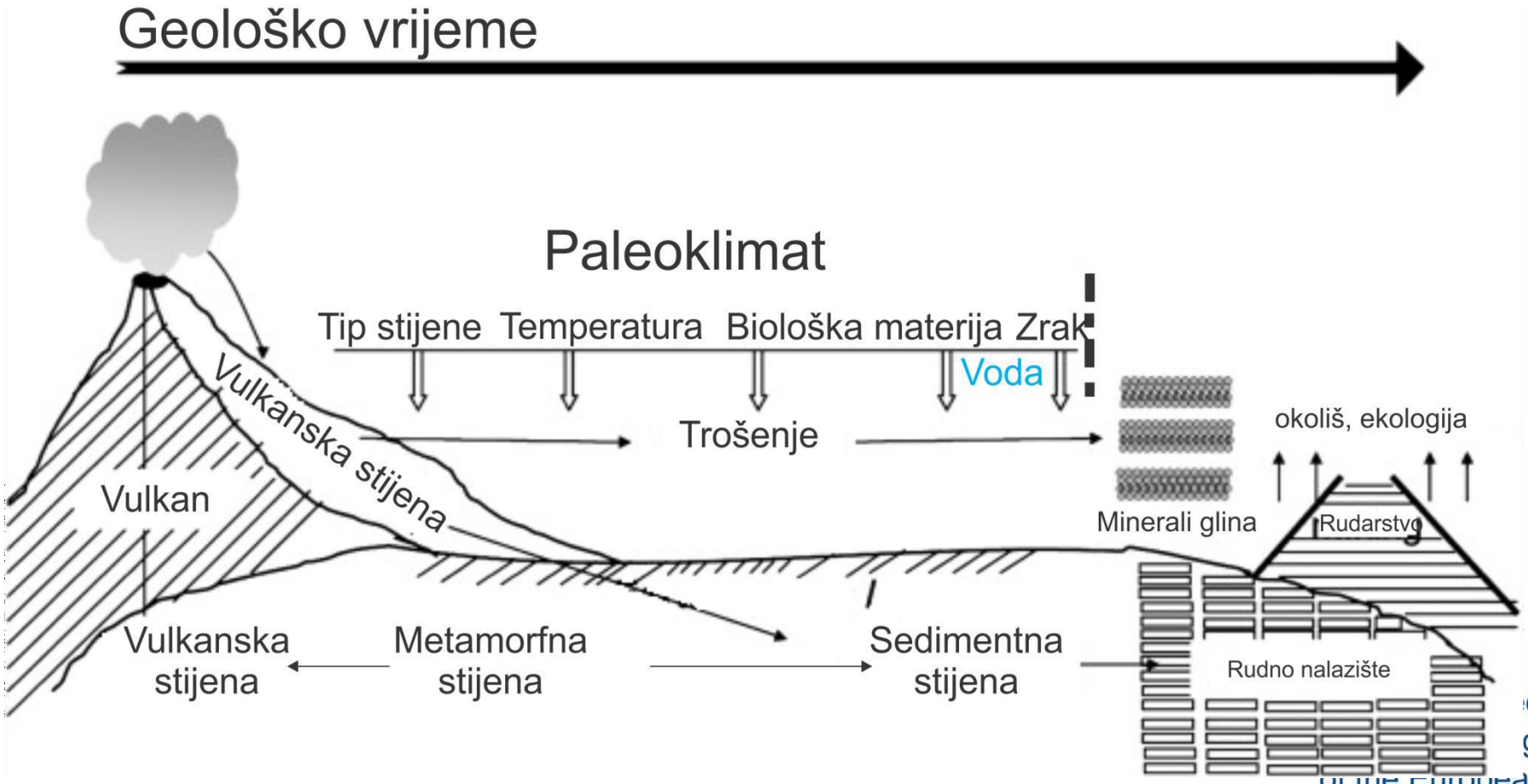
Zbijeno tlo



Slabo drenirano tlo

Co-funded by the Erasmus+ Programme of the European Union

Porijeklo i priroda mineralnog dijela tla



d by the
gramme
of the European Union

Važniji primarni i sekundarni minerali pronađeni u tlima. Minerali su poredani u niz prema rezistentnosti na raspadanje u humidnim umjereno-kontinentalnim klimatskim regijama (Brady, 1990)

Primarni minerali	Sekundarni minerali	Najviše rezistentni minerali
	Getit $FeOOH$ Hematit Fe_2O_3 Gibsit $Al_2O_3x3H_2O$	
Kvarc SiO_2	Minerali glina	
Muskovit $KAl_3Si_3O_{10}(OH)_2$		
Mikroklin $KAl_3Si_3O_8$		
Ortoklas $KAl_3Si_3O_8$		
Biotit $KAl(Mg, Fe)_3Si_3O_{10}(OH)_2$		
Albit $NaAl_3Si_3O_8$		
Hornblenda $Ca_2Al_2Mg_2\ Fe_3Si_6O_{24}$		
Augit $Ca_2(Al,Fe)_4(Mg,Fe)_4Si_6O_{24}$		
Anortit $CaAl_2Si_2O_8$		
Olivin $(Mg,Fe)_2SiO_4$	Dolomi $CaCO_3xMgCO_3$ Kalcit $CaCO_3$ Gips $CaSO_4xH_2O$	Najmanje rezistentni minerali

Co-funded by the Erasmus+ Programme of the European Union

Trošenje stijena i minerala

- Kombinacija procesa dezintegracije i dekompozicije
- Frakcija pijeska je sačinjena od individualnih minerala
- Stijene i minerali su podvrgnuti hemijskim silama i mijenjaju se

Co-funded by the Erasmus+ Programme of the European Union

MEHANIČKI AGENSI TROŠENJA:

1. Temperatura
2. **Erozija i depozicija**
3. Organizmi

HEMIJSKI AGENSI TROŠENJA:

1. Voda i u njoj rastvorene kiseline

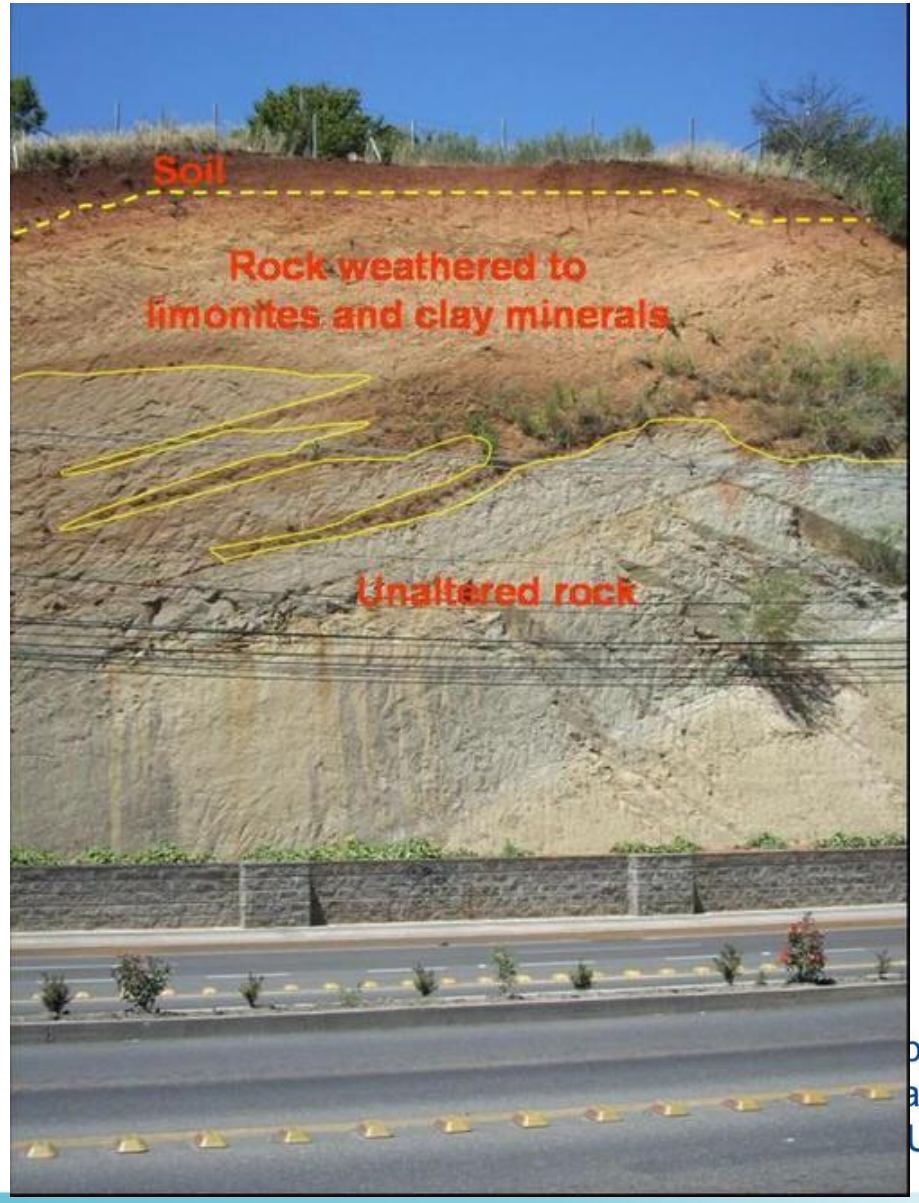
Co-funded by the Erasmus+ Programme of the European Union

Nastavna jedinica 2: Porijeklo mineralnog dijela tla i tekstura

Rastvaranje (kalcit)

$CaCO_3 + H_2CO_3 \rightarrow Ca_2+ + 2(HCO_3)$

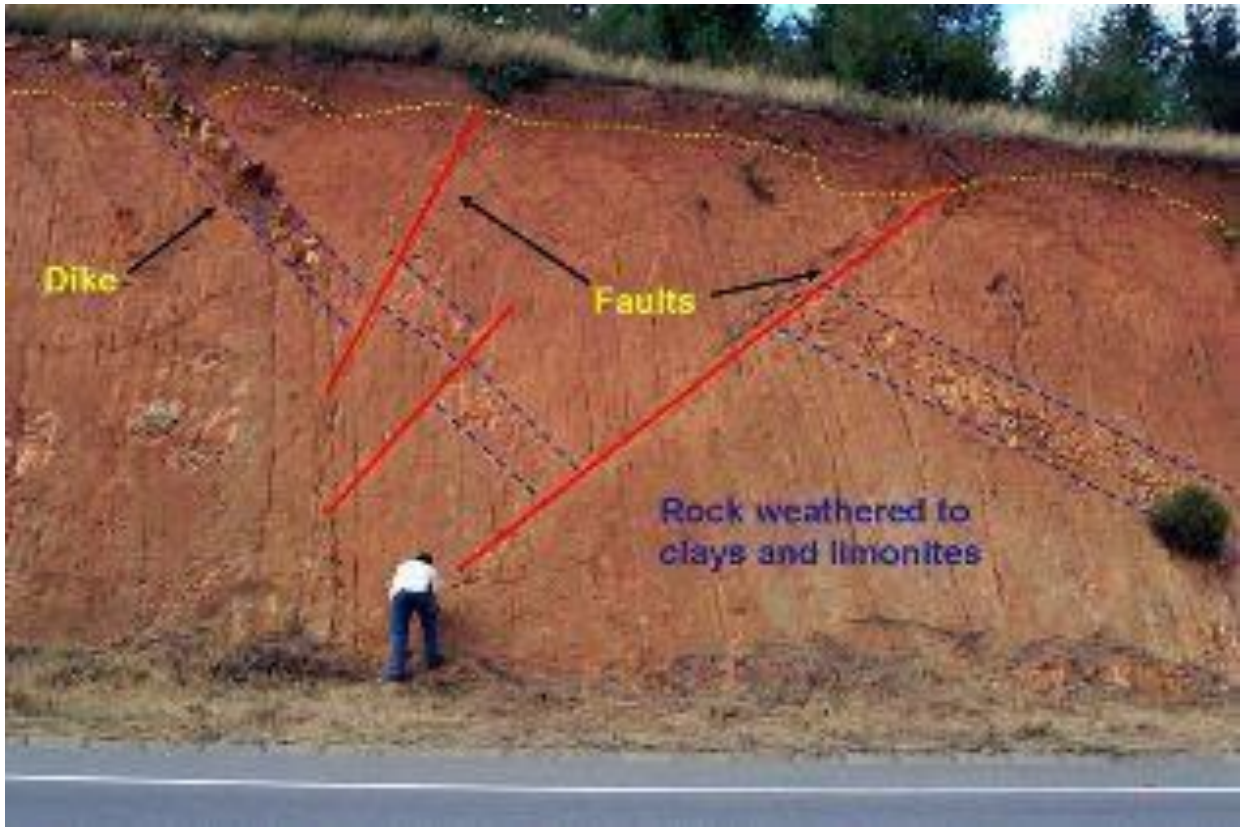
edimentna stijena potrošena u limonite i minerale glina



...by the ...amme ...Union

Oksidacija (proces kojim nastaju Fe-oksidi od minerala piroksena, olivina, pirita..)

$-Fe_2+ + O_2 + H_2O \rightarrow 2(Fe_2O_3x3H_2O)$

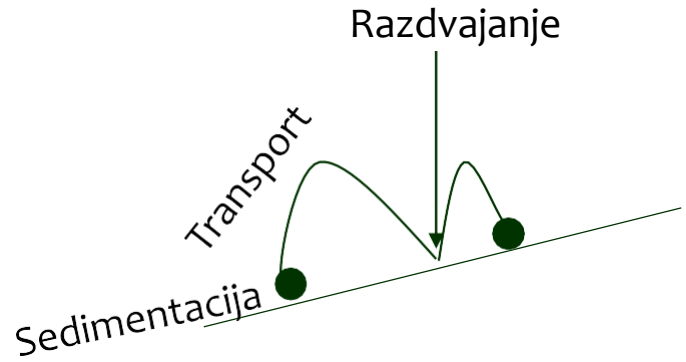


Metamorfna stijena potrošena u minerale gline

Co-funded by the Erasmus+ Programme of the European Union

SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Glavni faktori erozije



Gubitak tla erozijom

- Erozivnost padavina
- Erozivne osobine tla
- Nagib i dužina padine
- Pokrivenost vegetacijom i način korištenja zemljišta

Co-funded by the Erasmus+ Programme of the European Union

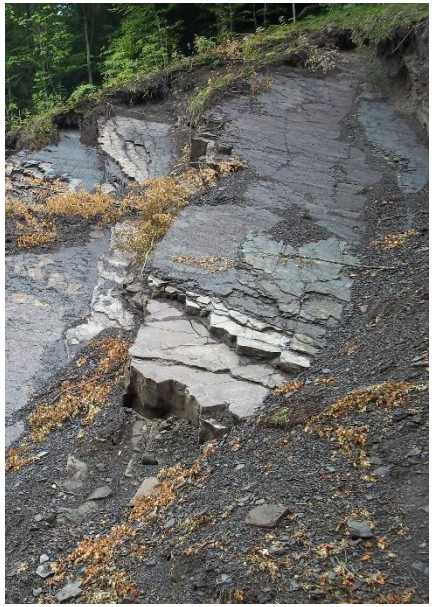
SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Granulometriski sastav funkcija matičnog supstrata

Geološka podloga

Pješčari	Verfenski pješčari, škriljci	Flišne formacije	Graniti, granodioriti, dioriti	Kristalasti škriljci	Peridotiti, serpentiniti	Krečnjaci

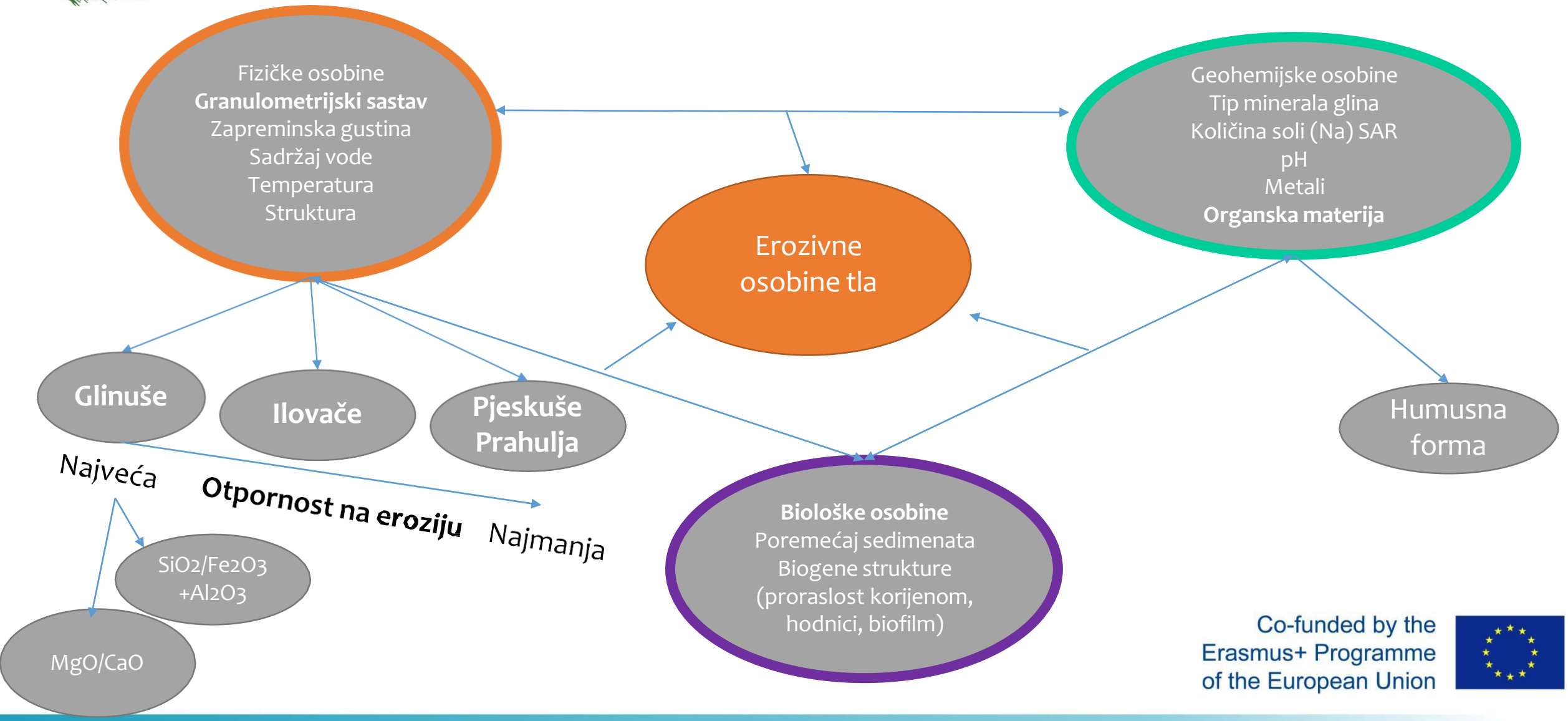


Co-funded by the Erasmus+ Programme of the European Union

SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Glavne osobine tla koje utiču na otpornost na eroziju

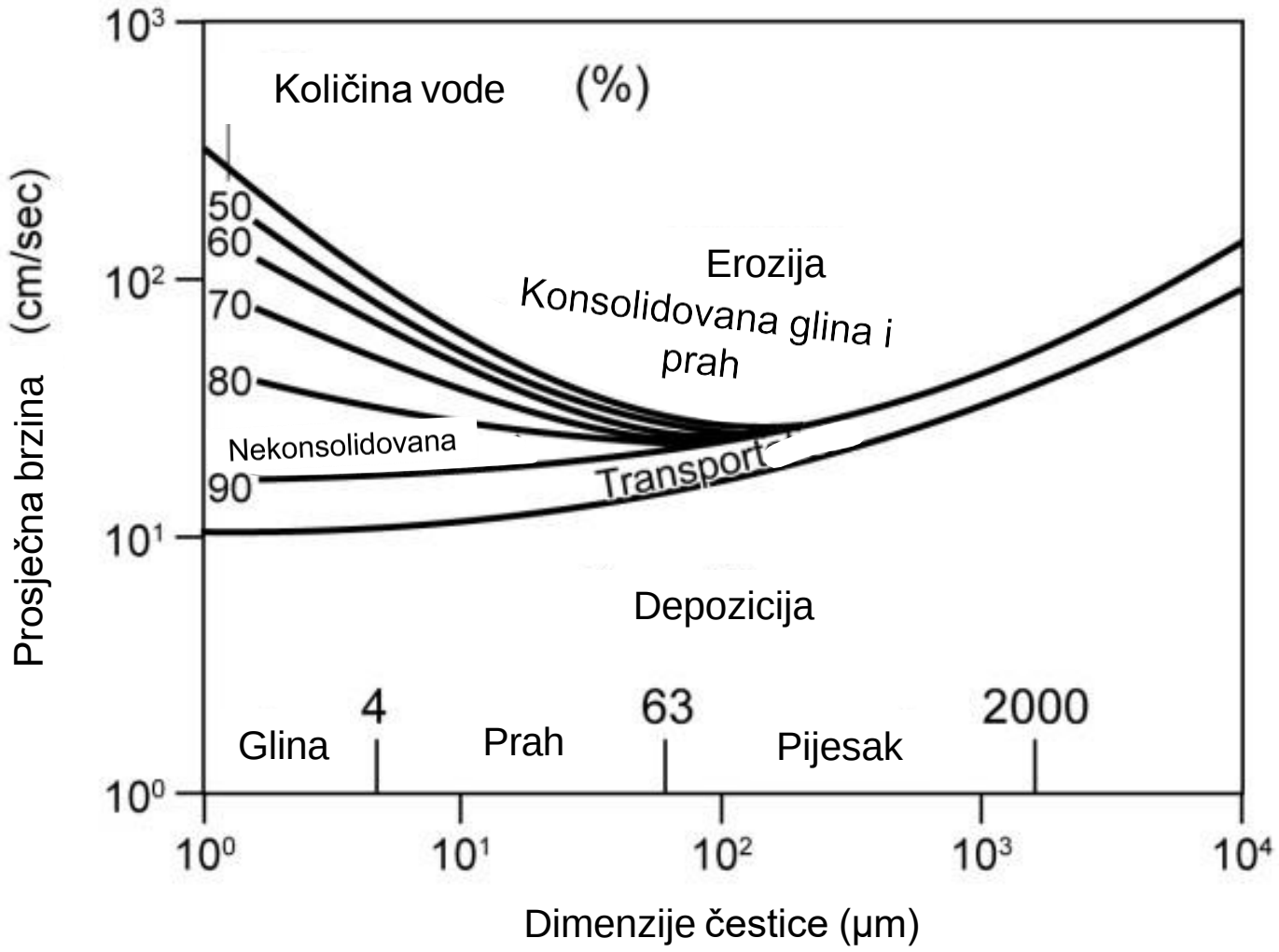


Co-funded by the Erasmus+ Programme of the European Union

Fizičke osobine

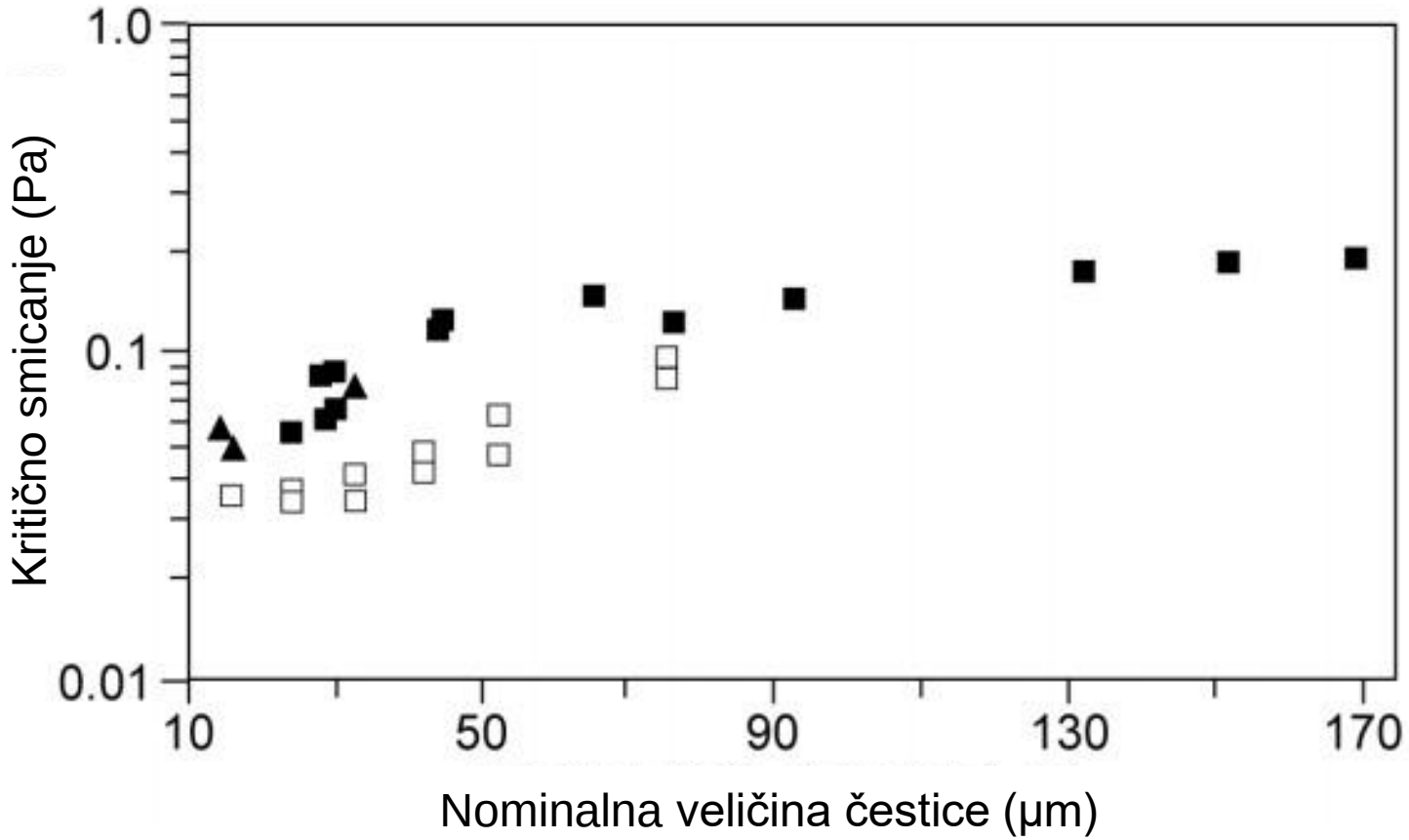
Granulometrijski sastav

Zapreminska gustina
Sadržaj vode
Temperatura
Struktura



Hjulström & Postma dijagram

Co-funded by the Erasmus+ Programme of the European Union

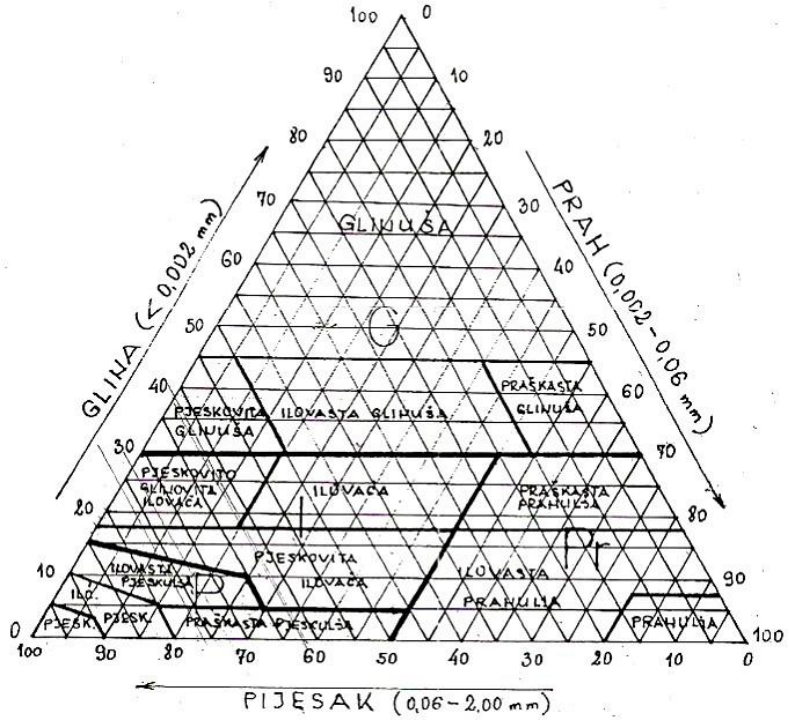


Dade et al., 1992

Co-funded by the Erasmus+ Programme of the European Union

Erozivnost

1. Prah
2. Praškasta glinuša
3. Ilovača
4. Pjeskovita ilovača
5. Praškasto glinovita ilovača
6. Glinovita ilovača
7. Ilovasti pijesak
8. Praškasta glina
9. Pjeskovito glinovita ilovača
10. Pijesak
11. Pjeskovita glinuša
12. Glinuša



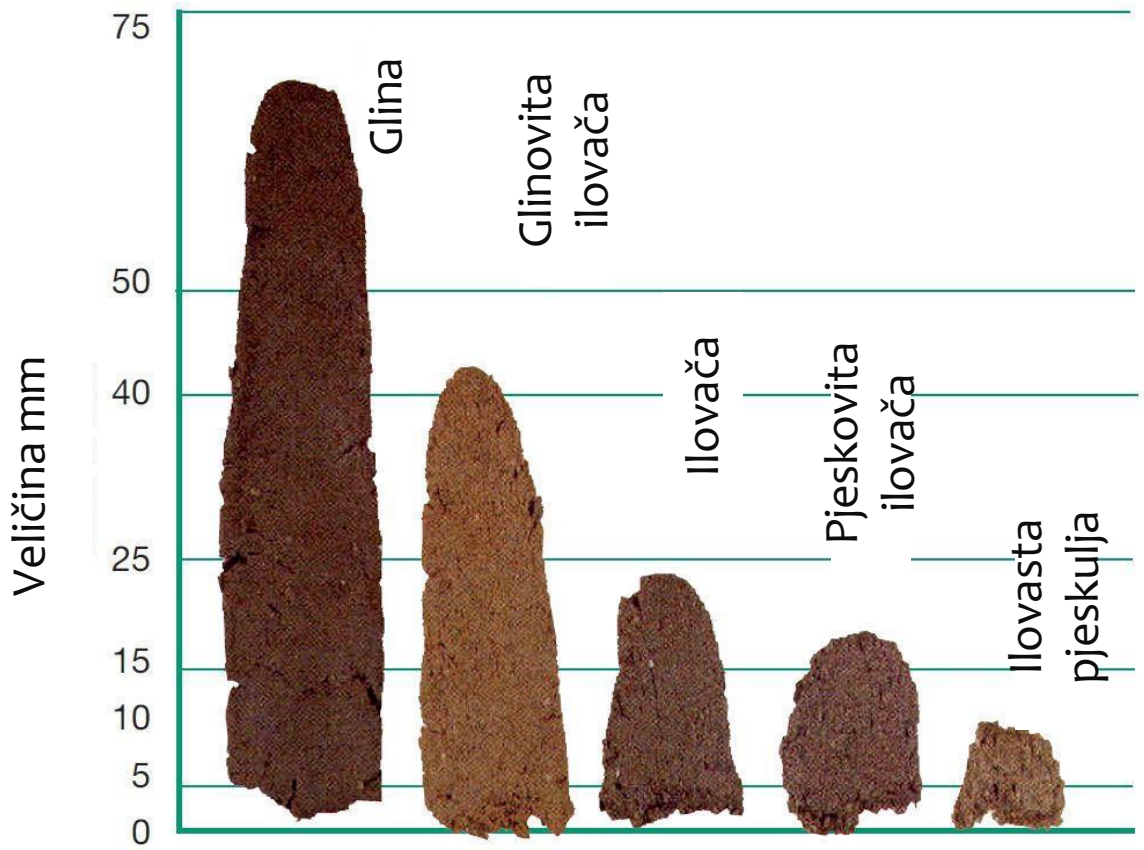
Co-funded by the Erasmus+ Programme of the European Union

Erodibilnost u odnosu na tip tla i teksturu Aguirre-Salado et al. 2017

Tip tla	Pijesak	Prah	Glina
Crnica Ranker	0.053	0.079	0.026
Luvisol	0.053	0.079	0.026
Vertisol	0.053	0.079	0.026

Co-funded by the Erasmus+ Programme of the European Union

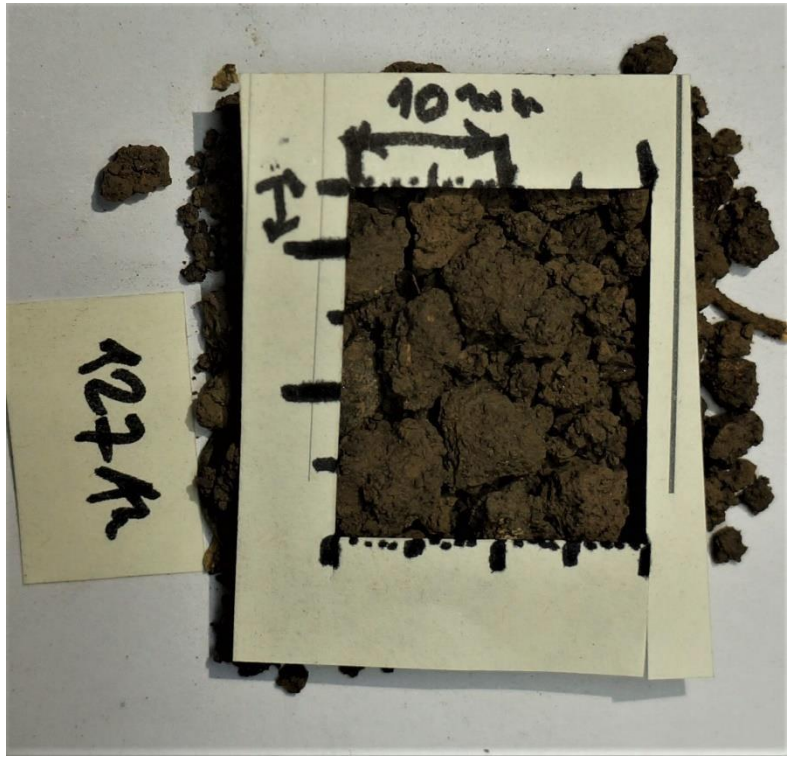
Primjer za ocjenu teksture



Co-funded by the Erasmus+ Programme of the European Union

Fizičke osobine
Granulometrijski sastav
Zapreminska gustina
Sadržaj vode
Temperatura

Struktura



Co-funded by the Erasmus+ Programme of the European Union

Zaštitna uloga prostirke

Biološke osobine
Poremećaj sedimenata
Biogene strukture
(proraslost korijenom, hodnici, biofilm)

Smektitske gline > ilitske gline > kaolinitske gline (Morgan, 2005)

Nivo apsorbovanog Na (SAR=Na/Ca+Mg)

Udio organske materije

Geohemijske osobine
Tip minerala glina
Količina soli (Na) SAR
pH
Metali
Organska materija

Co-funded by the Erasmus+ Programme of the European Union

SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

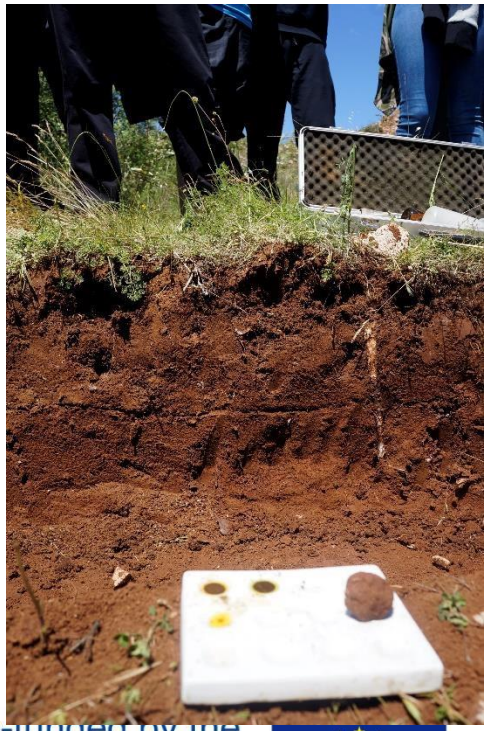
Serija tla na krečnjaku i dolomitu

Sirozem na krečnjaku-crnica na krečnjaku/rendzina na moreni-smeđe tlo-ilimerizovano

Erozivne osobine tla

Zajedničke osobine: glinovite ilovače i glinuše

U višim oblastima: ilovače, više erodirane



Co-funded by the Erasmus+ Programme of the European Union

SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Serija tla na silikatnim supstratima

Sirozem(silikatni) – humusno silikatno – kiselo smeđe tlo – Ilimerizovano/smeđe podzolasto/podzol

Erozivne osobine tla

Osobine

https://colbydigssoil.files.wordpress.com/2020/01/coxville-series-1-e1578860688734.jpg

Co-funded by the asmus+ Programme the European Union

SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Serija tla na silikatnim supstratima

Sirozem(silikatni) – humusno silikatno – rendzina
smeđe na peridotitu – eutrično smeđe - Ilimerizovano/smeđe duboko - pseudoglej

Erozivne osobine tla

Osobine

Co-funded by the Erasmus+ Programme of the European Union

SETOF Soil Erosion and TOrrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries

Serija tla na silikatnim supstratima
Smonica

Erozivne osobine tla

Osobine

https://colbydigssoil.com/page/5/

Co-funded by the Erasmus+ Programme of the European Union