

# Forme carsiche epigee (superficiali)

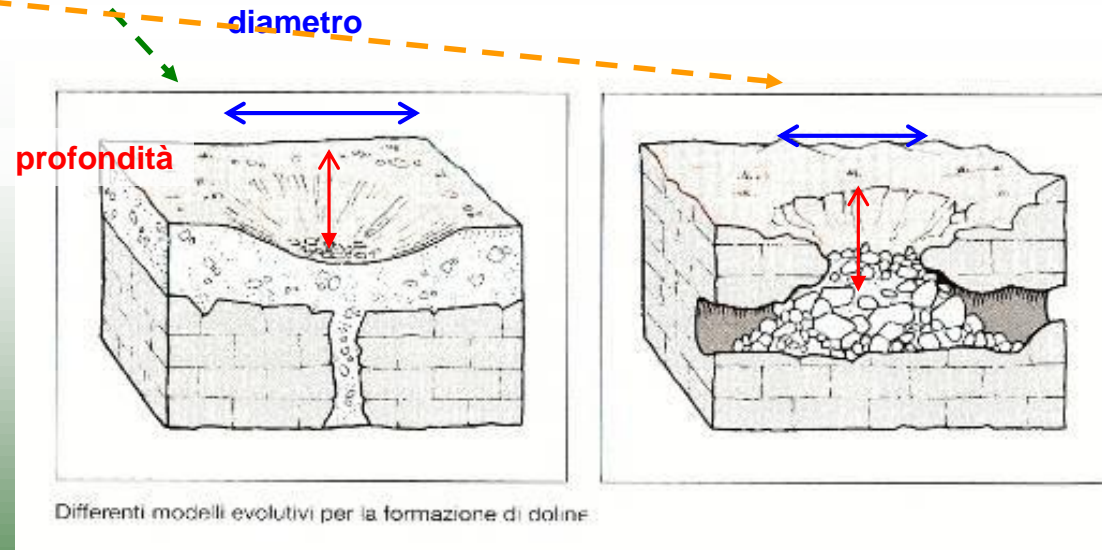
CATEGORIA	FORME PICCOLE	FORME MEDIO-GRANDI
Raccolta	<i>Vaschette</i>	
Ruscellamento	<i>Karren</i>	<i>Doline</i>
Infiltrazione	<i>Fori di dissoluzione crepacci</i>	<i>Pozzi, doline di crollo</i>
Emergenza	<i>Risorgenze</i>	<i>Polje</i>

Meglio scorrimento invece di ruscellamento

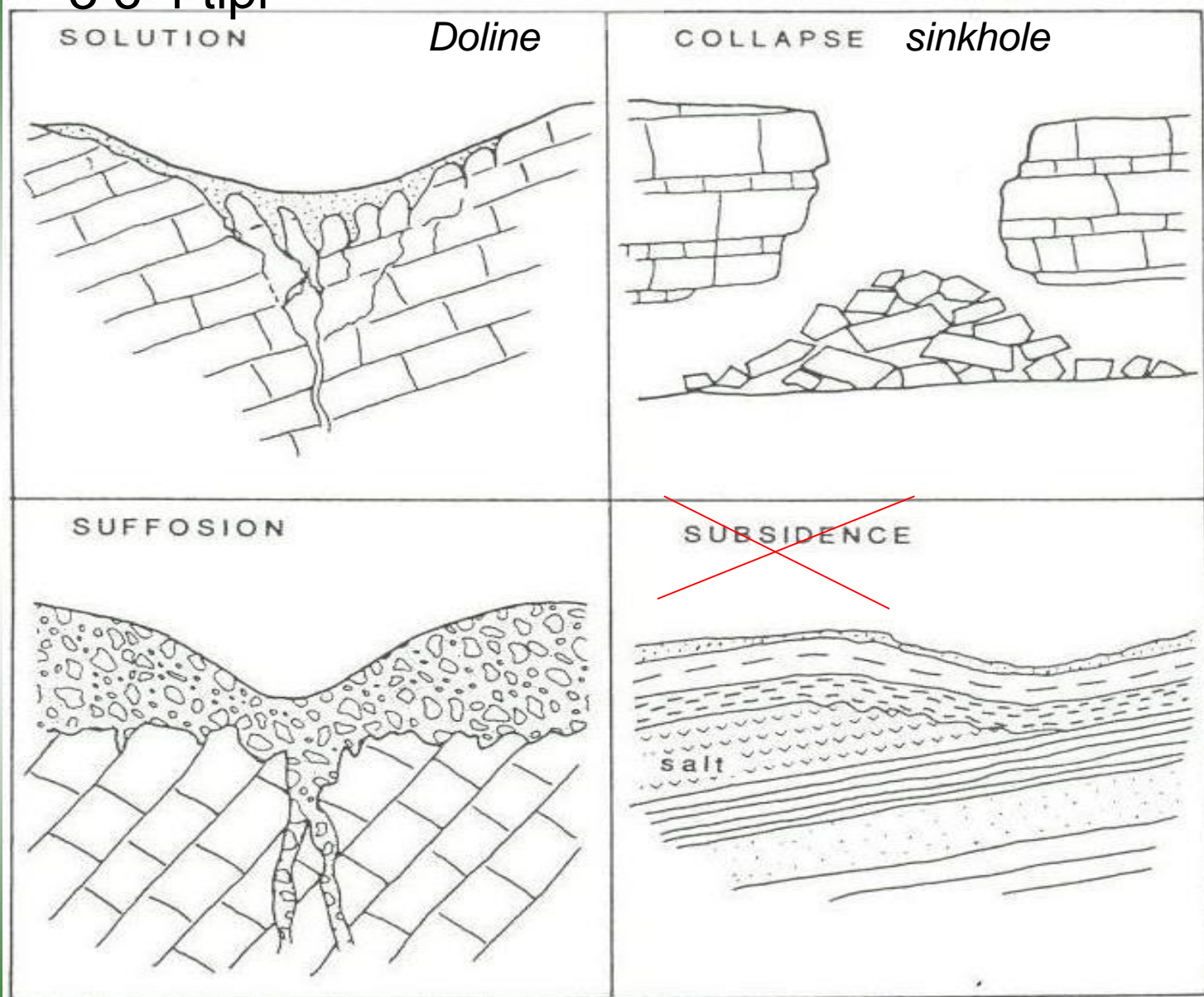
# Doline

- Le doline sono depressioni di dimensioni variabili da pochi metri ad alcune centinaia di metri di diametro. Il fondo della doline corrisponde ad **un punto di assorbimento concentrato dell'acqua**. Si distinguono in:
  - **Doline di dissoluzione.** Si formano quando esistono nei calcari fratture che facilitano il drenaggio delle acque. Quando si forma una depressione embrionale, questa richiama acque dalle aree adiacenti, i fenomeni corrosivi si autoalimentano, e la depressione si approfondisce e si allarga.
  - **Doline di crollo:** si formano per il crollo del soffitto di una cavità carsica sottostante

Nei due casi la morfologia è molto diversa



# Meglio ancora 3 o 4 tipi



r. Solubili/  
Carsificabili  
In superficie.

R. solubili o  
carsificabili  
nel sottosuolo  
In superficie  
detriti o rocce  
Non carsificabili

# Doline di dissoluzione



1 dolina piccolissima: 8-10 m di diametro 1.2-1.5 di prof. Sul fondo:  
pozzo (eccezione più che regola)

2 dolina grande: asse maggiore 250-280 m, prof 25.30 m. Acqua sul  
fondo: (eccezione più che regola)

Dolina ampia circa 400 m  
piccola pozza sul fondo  
Dolina del Principe  
Duino



# Doline di dissoluzione



Doline a piatto o a ciotola:  $\text{Diametro/profondità} \geq 2$   
Doline ad imbuto:  $\text{Diam/prof: compreso tra 1 e 2}$   
Classificazione...inutile...



Dolina di crollo presso Opicina

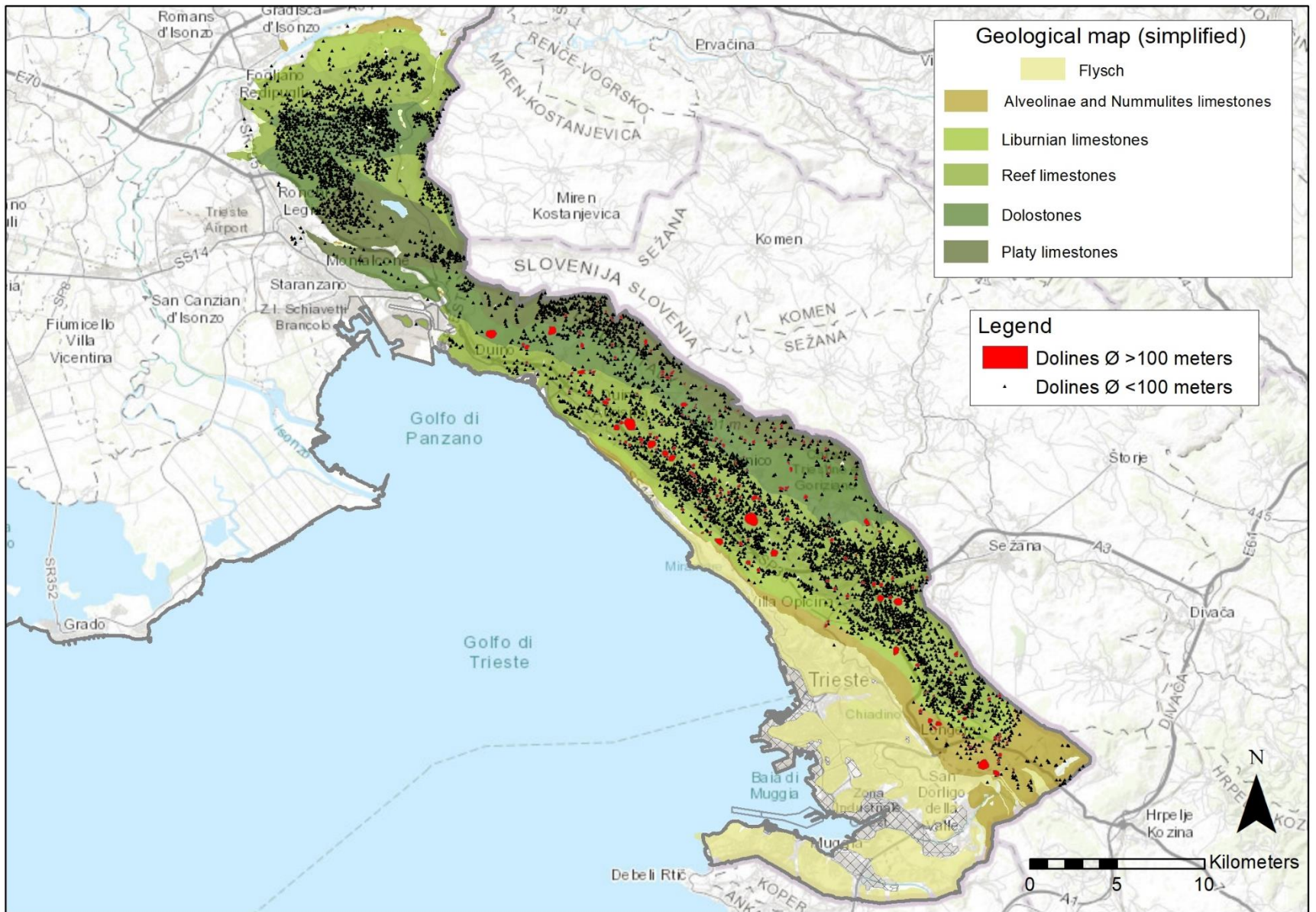
# Doline di crollo: Sinkholes



**Novembre del 2003 in una dolina a 300 m SSE dalla chiesa di Samatorza (TS). In mezzo al campo si è aperto uno sprofondamento di 6 m di profondità e 4 m di diametro con pareti verticali, che termina in un pozzo.**

**Doline a Pozzo: diametro/profondità < 1**

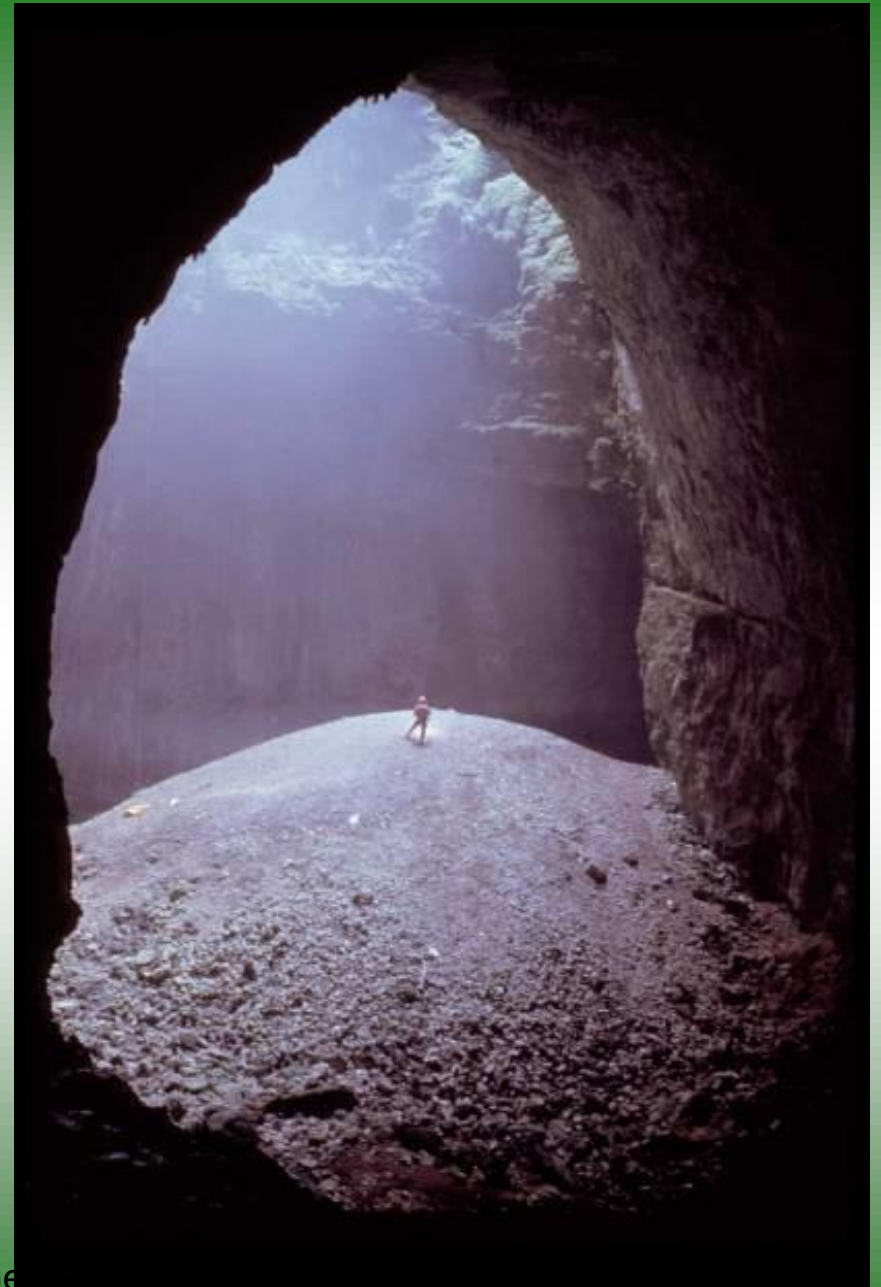




# Futura doline di crollo

Grotta Noé  
(Aurisina, TS). 60  
m dalla superficie  
carsica alla base  
del pozzo

Forma di  
passaggio tra  
carsismo epigeo  
ed ipogeo



# Florida's Sinkholes

**Sinkhole:** A circular depression in a karst area. Its drainage is subterranean, its size is measured in meters or tens of meters, and it is commonly funnel-shaped. Syn: doline; sink.

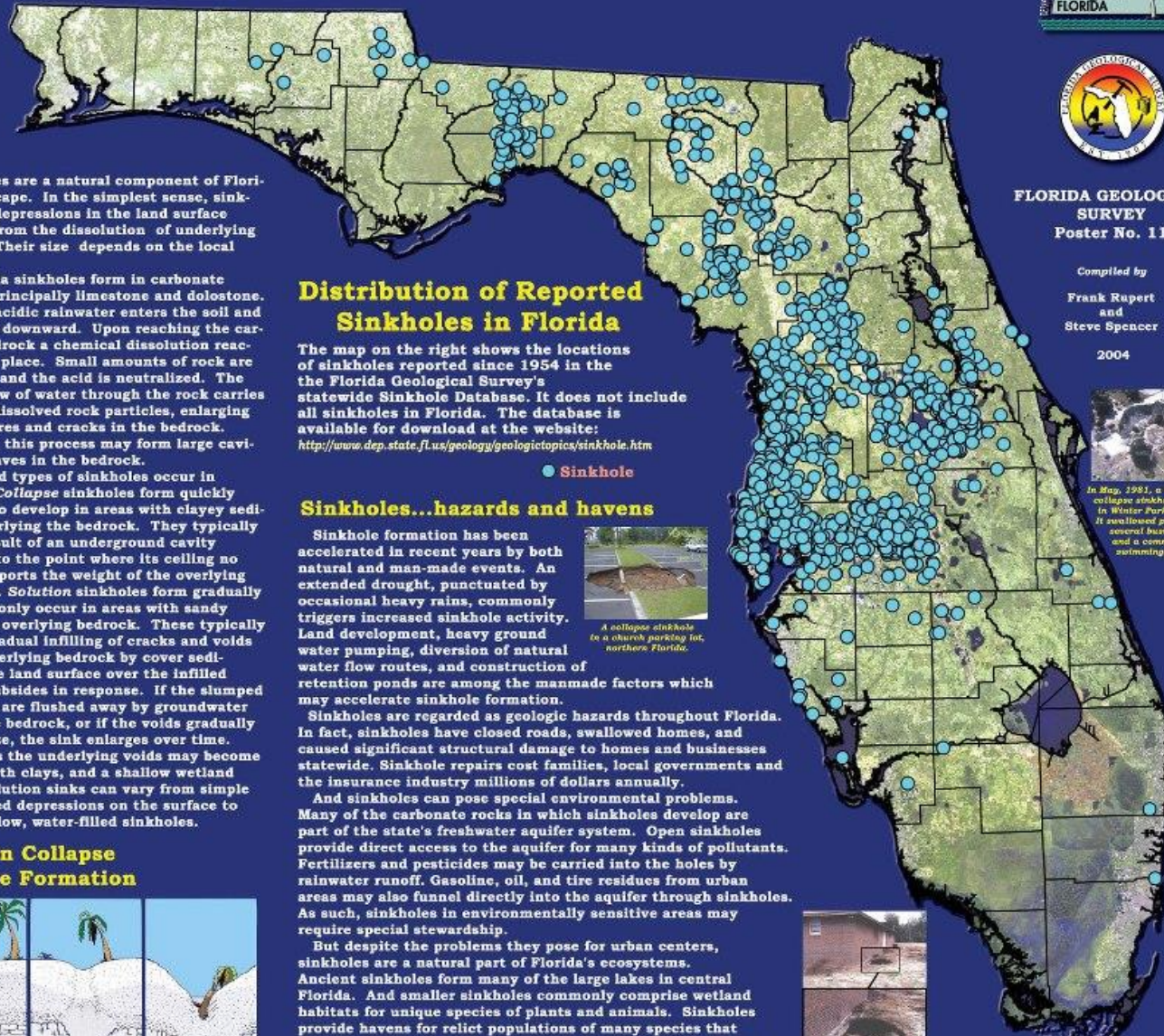
(from Bates and Jackson, *Dictionary of Geological terms*.)



FLORIDA GEOLOGICAL  
SURVEY  
Poster No. 11

Compiled by  
Frank Rupert  
and  
Steve Spencer

2004



Sinkholes are a natural component of Florida's landscape. In the simplest sense, sinkholes are depressions in the land surface resulting from the dissolution of underlying bedrock. Their size depends on the local geology.

In Florida sinkholes form in carbonate bedrock, principally limestone and dolostone. Naturally acidic rainwater enters the soil and percolates downward. Upon reaching the carbonate bedrock a chemical dissolution reaction takes place. Small amounts of rock are dissolved, and the acid is neutralized. The natural flow of water through the rock carries away the dissolved rock particles, enlarging natural pores and cracks in the bedrock. Over time, this process may form large cavities and caves in the bedrock.

Two broad types of sinkholes occur in Florida. *Collapse* sinkholes form quickly and tend to develop in areas with clayey sediments overlying the bedrock. They typically are the result of an underground cavity enlarging to the point where its ceiling no longer supports the weight of the overlying sediments. *Solution* sinkholes form gradually and commonly occur in areas with sandy sediments overlying bedrock. These typically form by gradual infilling of cracks and voids in the underlying bedrock by cover sediments. The land surface over the infilled bedrock subsides in response. If the slumped sediments are flushed away by groundwater flow in the bedrock, or if the voids gradually grow in size, the sink enlarges over time. Sometimes the underlying voids may become plugged with clays, and a shallow wetland forms. Solution sinks can vary from simple bowl-shaped depressions on the surface to open, shallow, water-filled sinkholes.

## Stages in Collapse Sinkhole Formation



## Distribution of Reported Sinkholes in Florida

The map on the right shows the locations of sinkholes reported since 1954 in the the Florida Geological Survey's statewide Sinkhole Database. It does not include all sinkholes in Florida. The database is available for download at the website:

<http://www.dep.state.fl.us/geology/geologictopics/sinkhole.htm>

● Sinkhole

## Sinkholes...hazards and havens

Sinkhole formation has been accelerated in recent years by both natural and man-made events. An extended drought, punctuated by occasional heavy rains, commonly triggers increased sinkhole activity. Land development, heavy ground water pumping, diversion of natural water flow routes, and construction of retention ponds are among the manmade factors which may accelerate sinkhole formation.



A collapse sinkhole in a church parking lot, northern Florida.

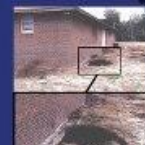
Sinkholes are regarded as geologic hazards throughout Florida. In fact, sinkholes have closed roads, swallowed homes, and caused significant structural damage to homes and businesses statewide. Sinkhole repairs cost families, local governments and the insurance industry millions of dollars annually.

And sinkholes can pose special environmental problems. Many of the carbonate rocks in which sinkholes develop are part of the state's freshwater aquifer system. Open sinkholes provide direct access to the aquifer for many kinds of pollutants. Fertilizers and pesticides may be carried into the holes by rainwater runoff. Gasoline, oil, and tire residues from urban areas may also funnel directly into the aquifer through sinkholes. As such, sinkholes in environmentally sensitive areas may require special stewardship.

But despite the problems they pose for urban centers, sinkholes are a natural part of Florida's ecosystems. Ancient sinkholes form many of the large lakes in central Florida. And smaller sinkholes commonly comprise wetland habitats for unique species of plants and animals. Sinkholes provide havens for relict populations of many species that



In May, 1981, a large cover-collapse sinkhole opened in Winter Park, Florida. It swallowed portions of several businesses and a community swimming pool.



# Guatemala city

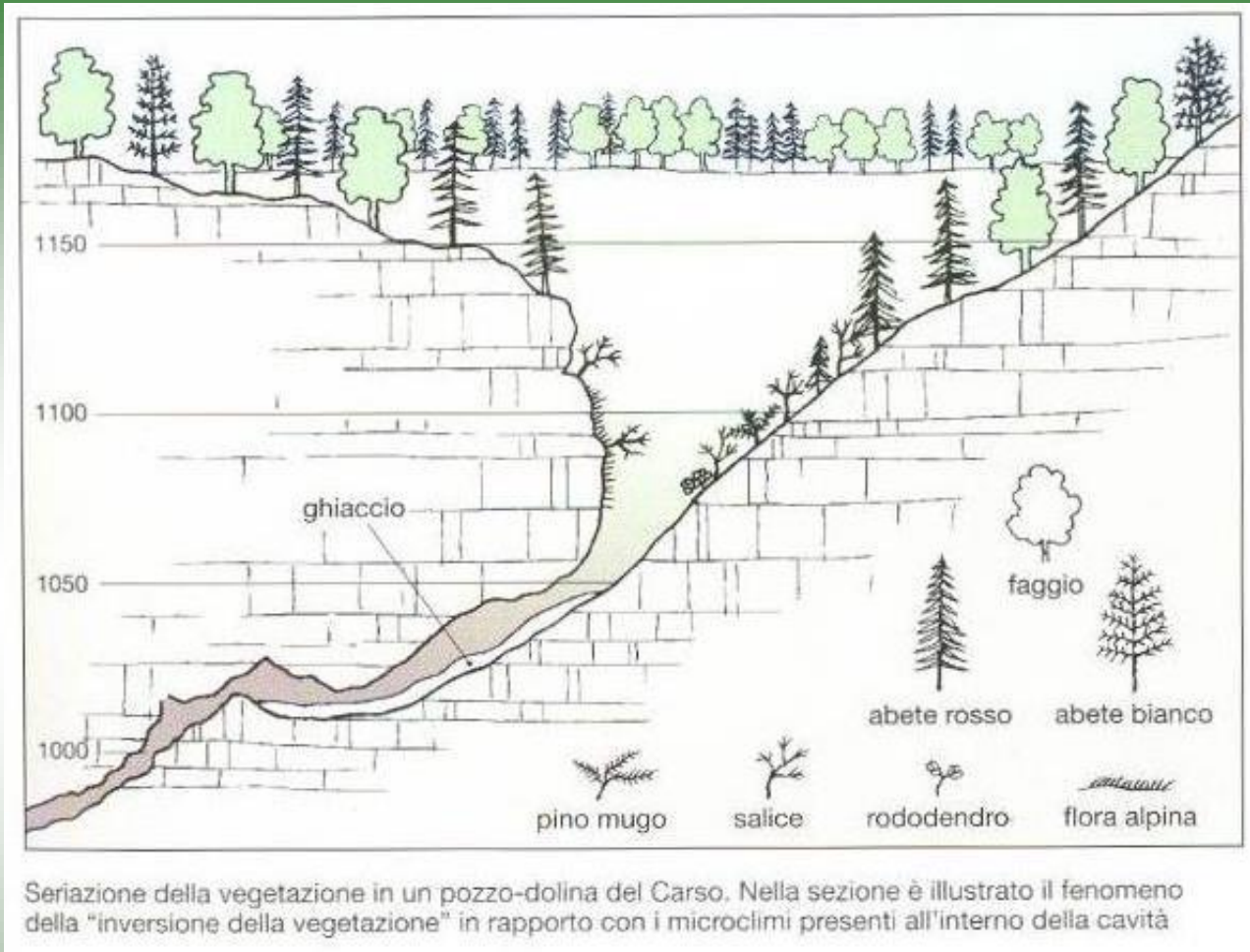


# Dolina di suffusione (Sauris, UD)



Affiorano arenarie e siltiti della Fm. di Werfen (Trias)  
E sotto che formazione c'è ??

# Microclima delle doline

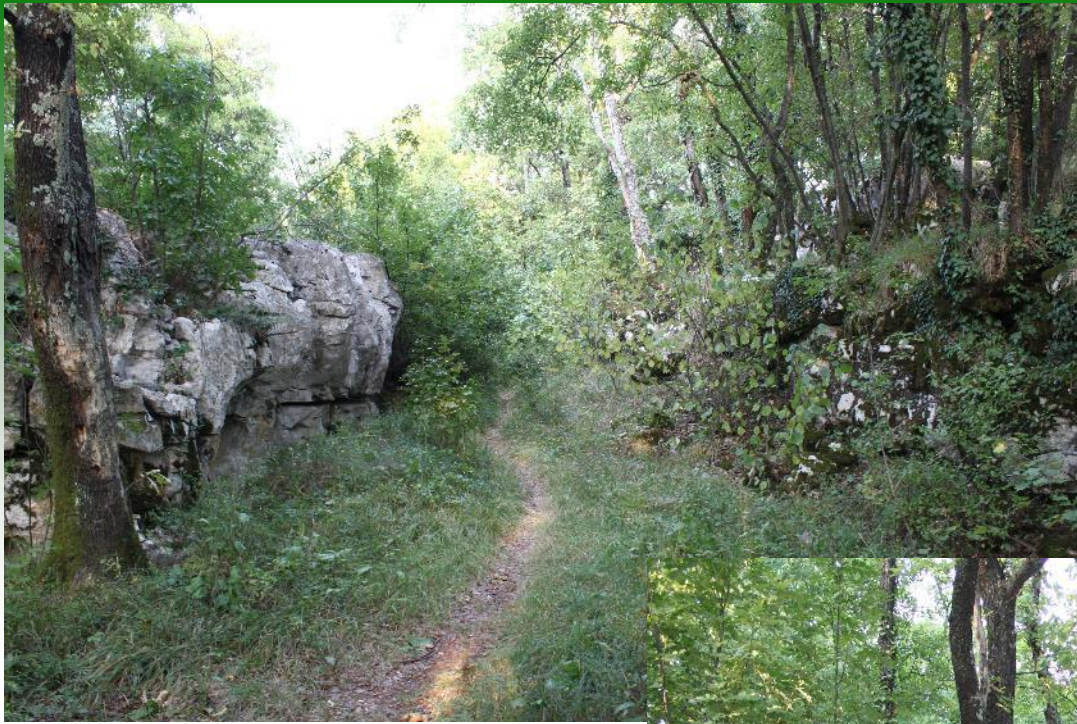


Gradiente termico: - 7 °C per ogni 100 m di prof. Molto maggiore di quello esterno.  
Sul fondo di una dolina profonda 50 m c'è la temperatura equivalente a + 600 rispetto alla superficie esterna: . Conseguenza: le doline hanno una vegetazione...pre alpina..  
E il fondo di certe doline è un ...freezer

# Altre macroforme superficiali legate a dissoluzione e crolli le «**roofless cave**»: una galleria con il soffitto crollato



# A Ovest di Borgo Grotta Gigante



2020-2021



# UVALA

Termine poco usato, discusso. In passato: Depressione carsica formata dall'unione di più doline...che si allargano e si fondono

Large closed depression formed by the coalescence of several dolines which have enlarged towards each other.

— *Sweeting, M. M. (1973)*



Più recentemnte (Calic, 2011): Studio geografico nella zona del Velebit in generale sulla Dinaridi (ex Jugo)

«This mapping “revealed dominant development of uvalas along tectonically ‘broken zones’ of regional scale”, the ‘broken zones’ being highly permeable”. Quindi depressioni legate alla presenza di linee tettoniche

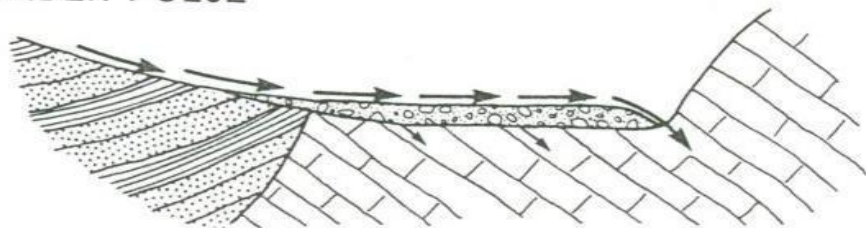
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# Polje

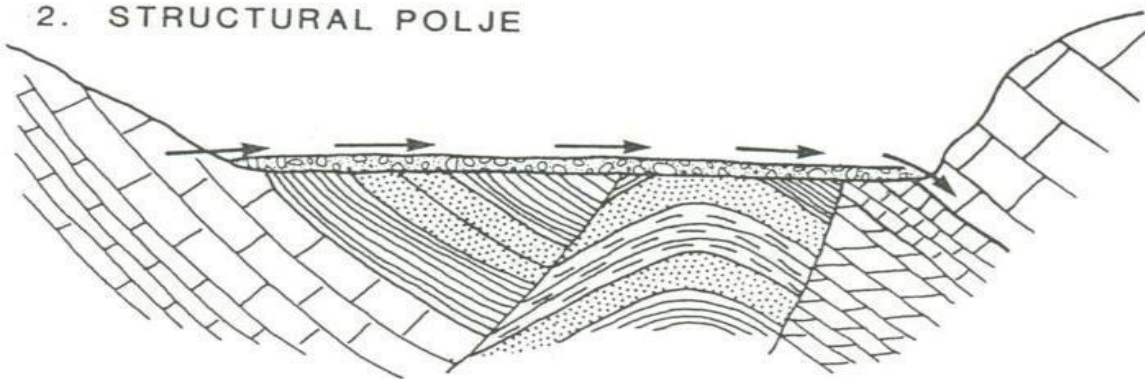


Depressioni ampie a fondo piatto più o meno impermeabile, con un angolo Netto tra bordi e fondo  
Spesso i bordi del poljie corrispondono a linee tettoniche  
Ovvero forma mista carsico-tettonica

### 1. BORDER POLJE



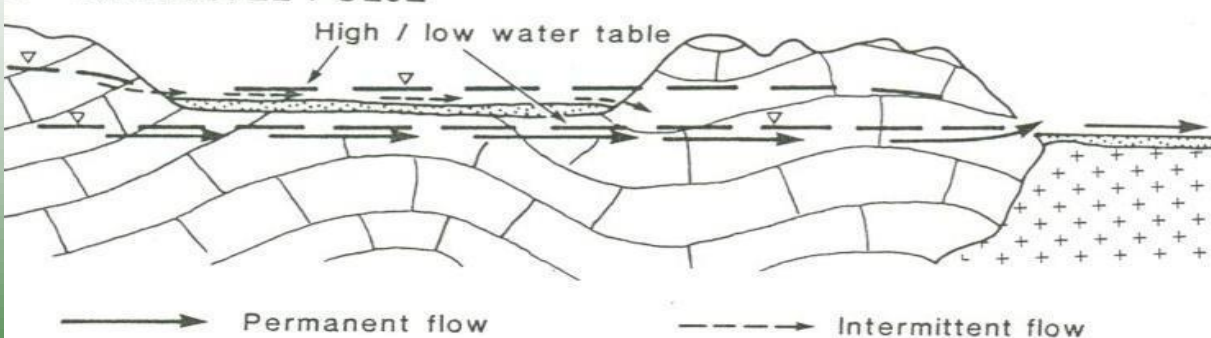
### 2. STRUCTURAL POLJE



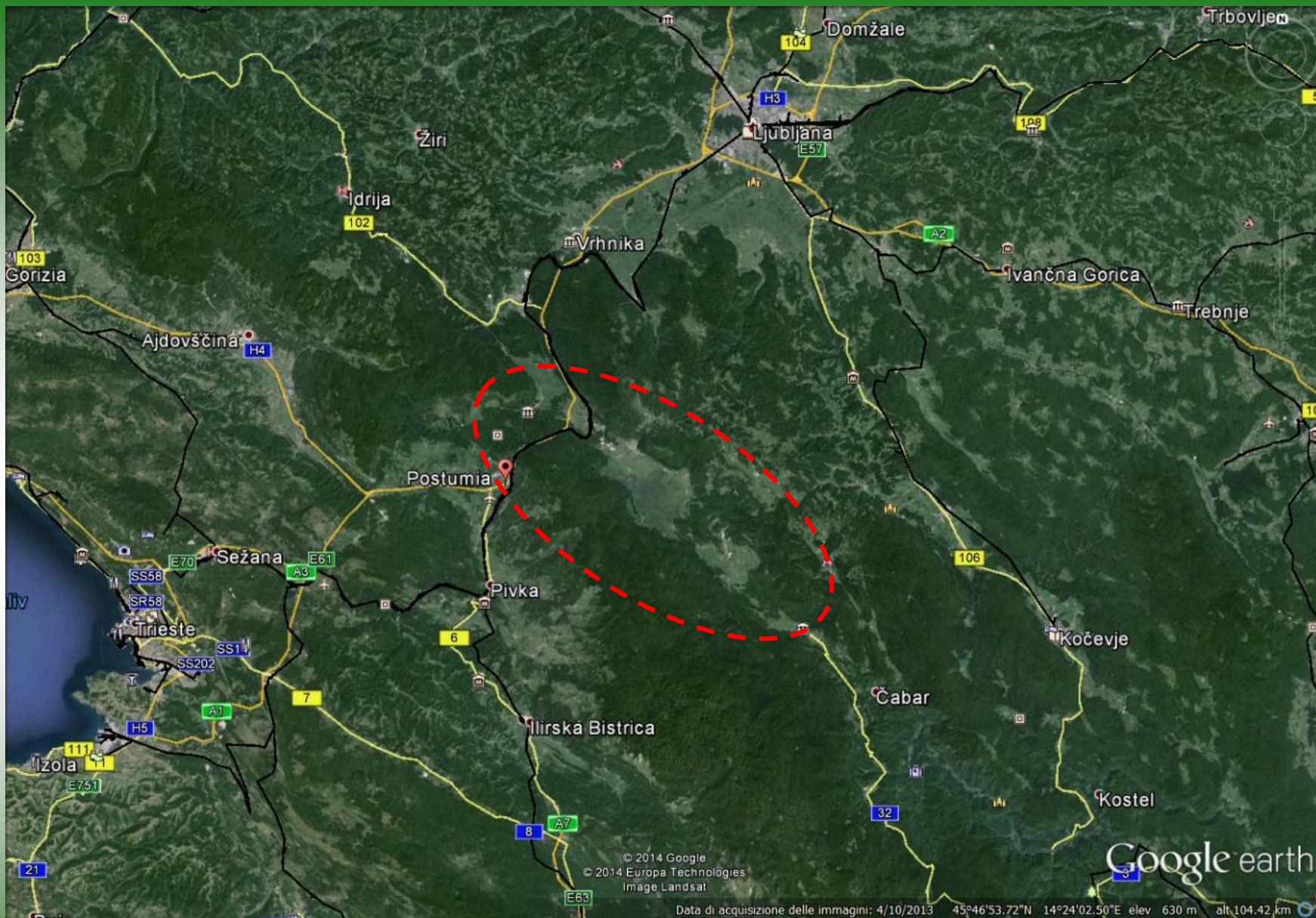
Un lato in r. Impermeabili,  
Un lato carsificabile,  
sul fondo  
depositi alluvionali  
impermeabili...ma sotto  
Calcari p. Marginale

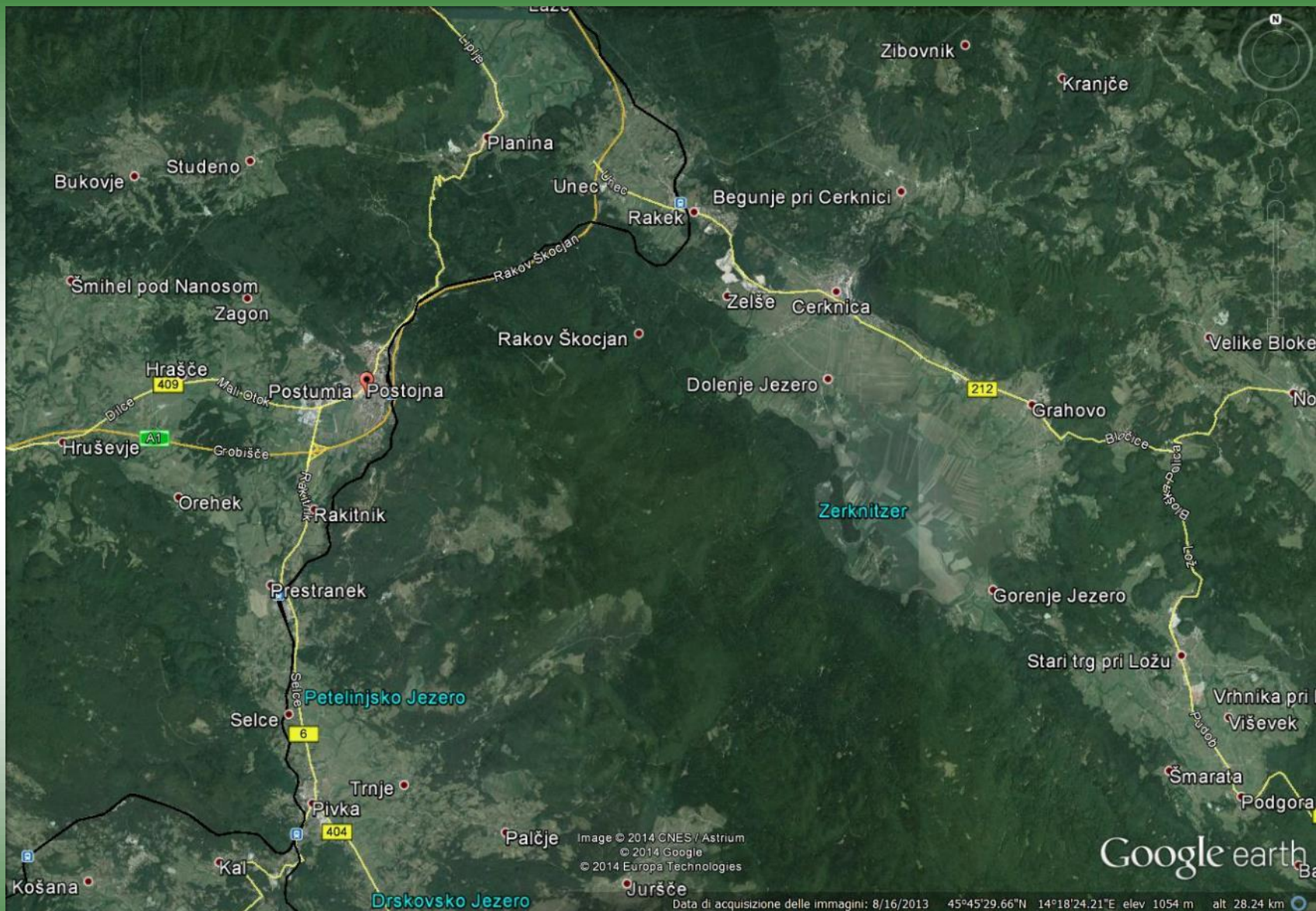
Due lati carsificabili, faglie,  
Fondo impermeabile

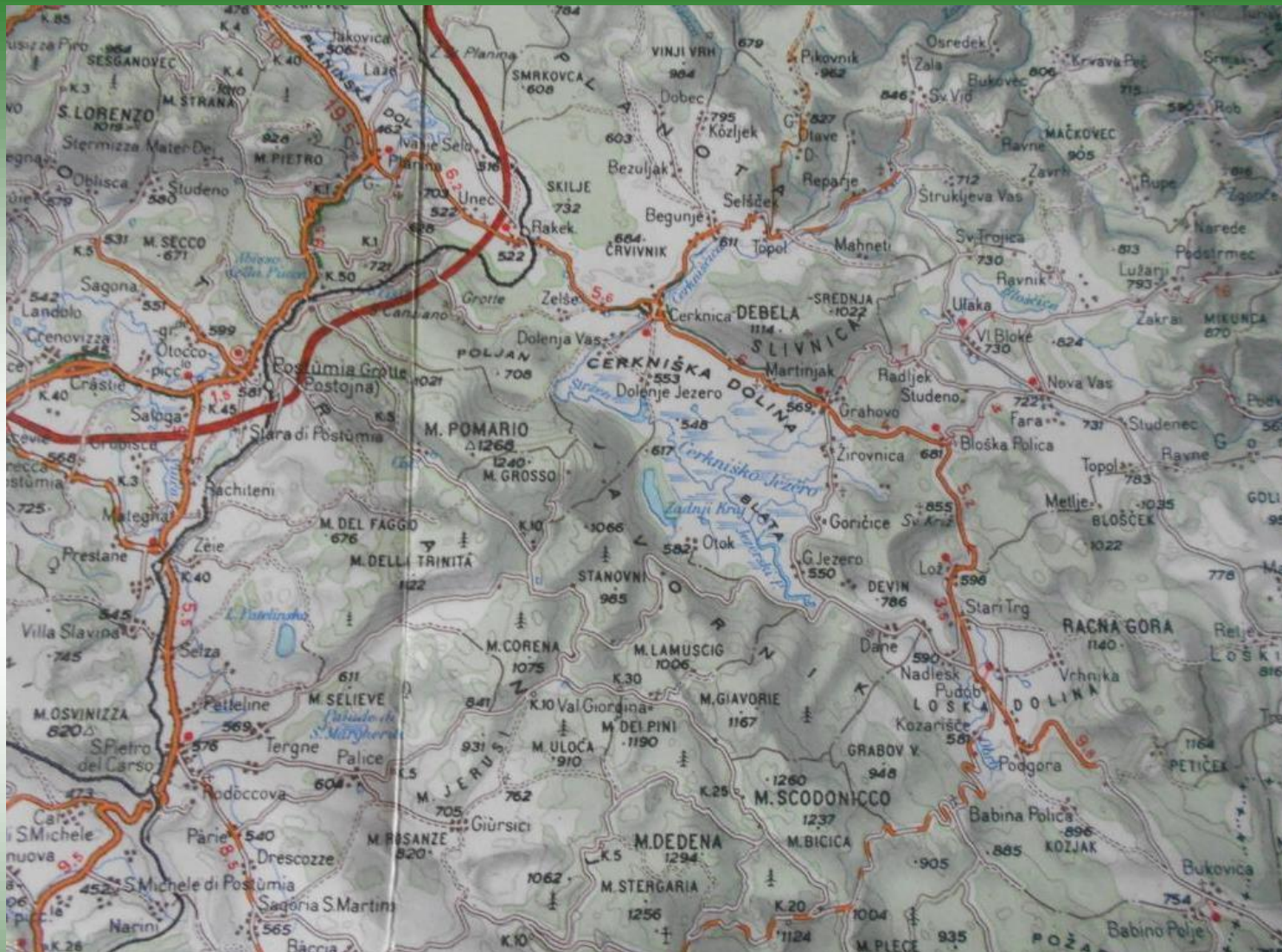
### 3. BASELEVEL POLJE



R. tutte carsificabili  
Fondo coincidente con  
Il livello di base.  
P. di livello piezometrico









# Polje

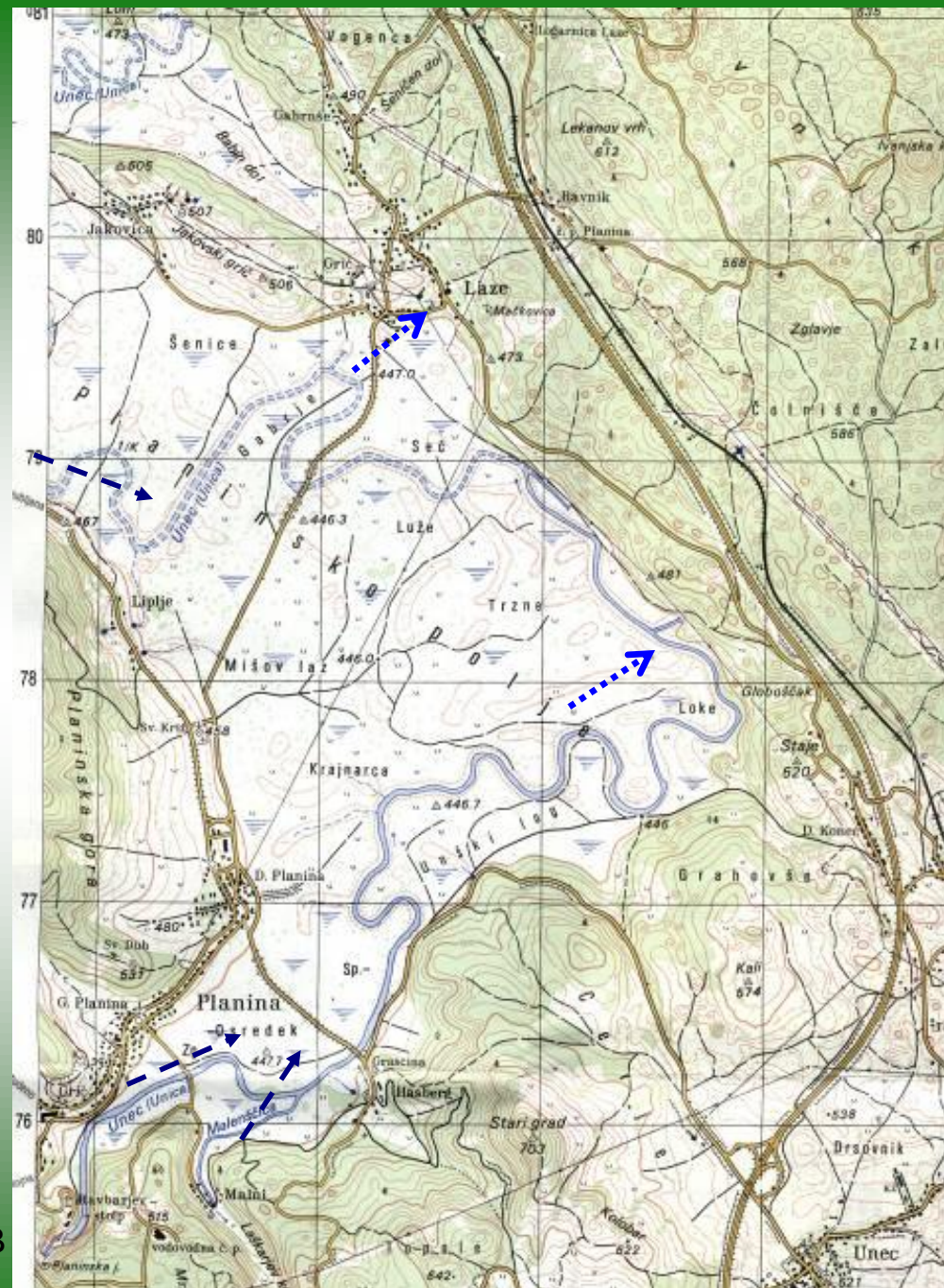
## Polje di Planina

Area a Nord Est di Postumia

(Postojna, Adelsberg)

(uscita autostradale Unec)

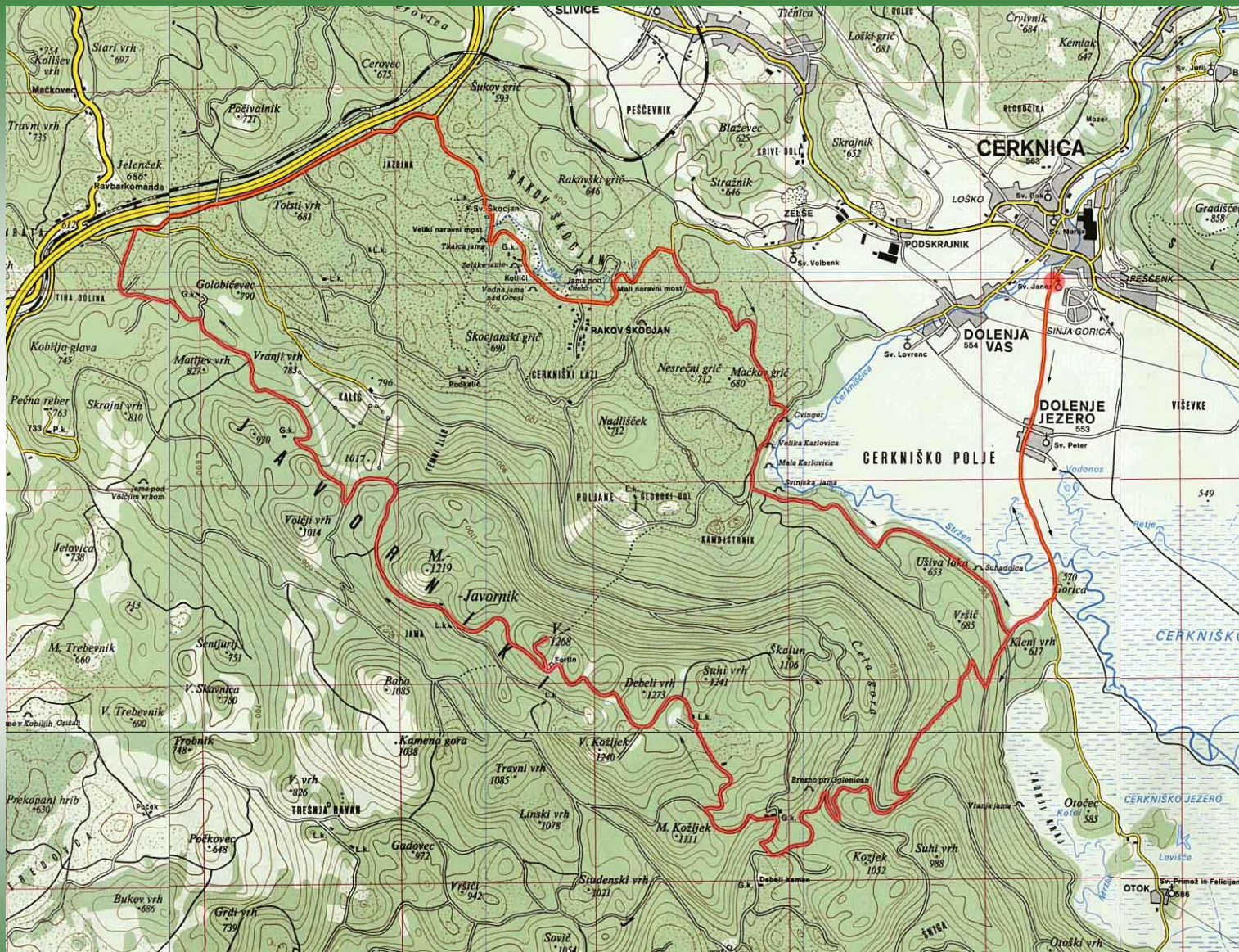
Le acque provengono da Sud, Sud-Ovest, dalle grotte di Postumia e dal Rio dei Gamberi, escono dal cavernone di Planina attraversano l'area pianeggiante del Polje e proseguono verso Nord, Nord-Est verso Ljubiana





# Cavernone di Planina







Verso Postumia

Dal polje di Circonio

2020-2021

Carso B GFGeol/STAN/



# Cerknisko Jesero – lago temporaneo del Circonio sul fondo di un Polje



2020-2021

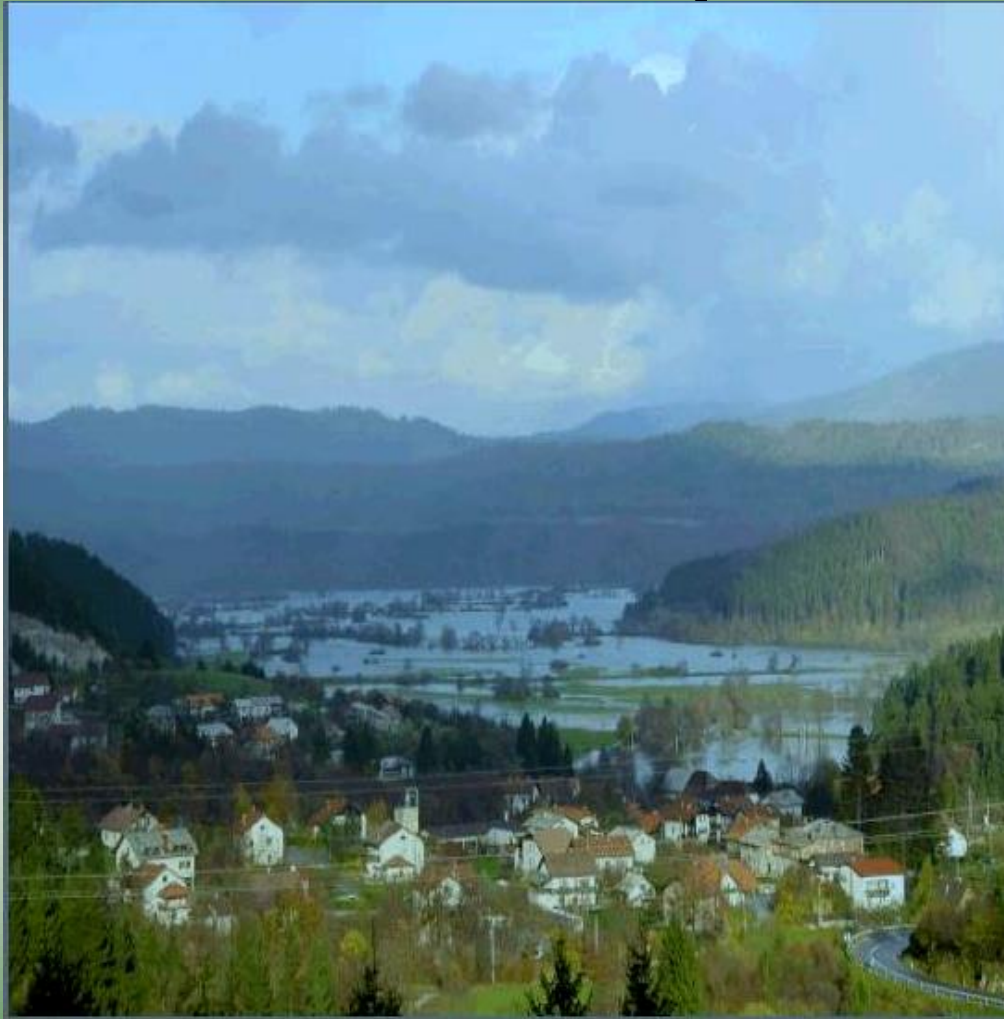


Inversac:  
Inghiottitoi ma  
anche  
risorgenze



Carso B GFGeol -STAN

# Polje di Planina



# Il Polje di Doberdò







## Lago di Doberdò in magra e in piena

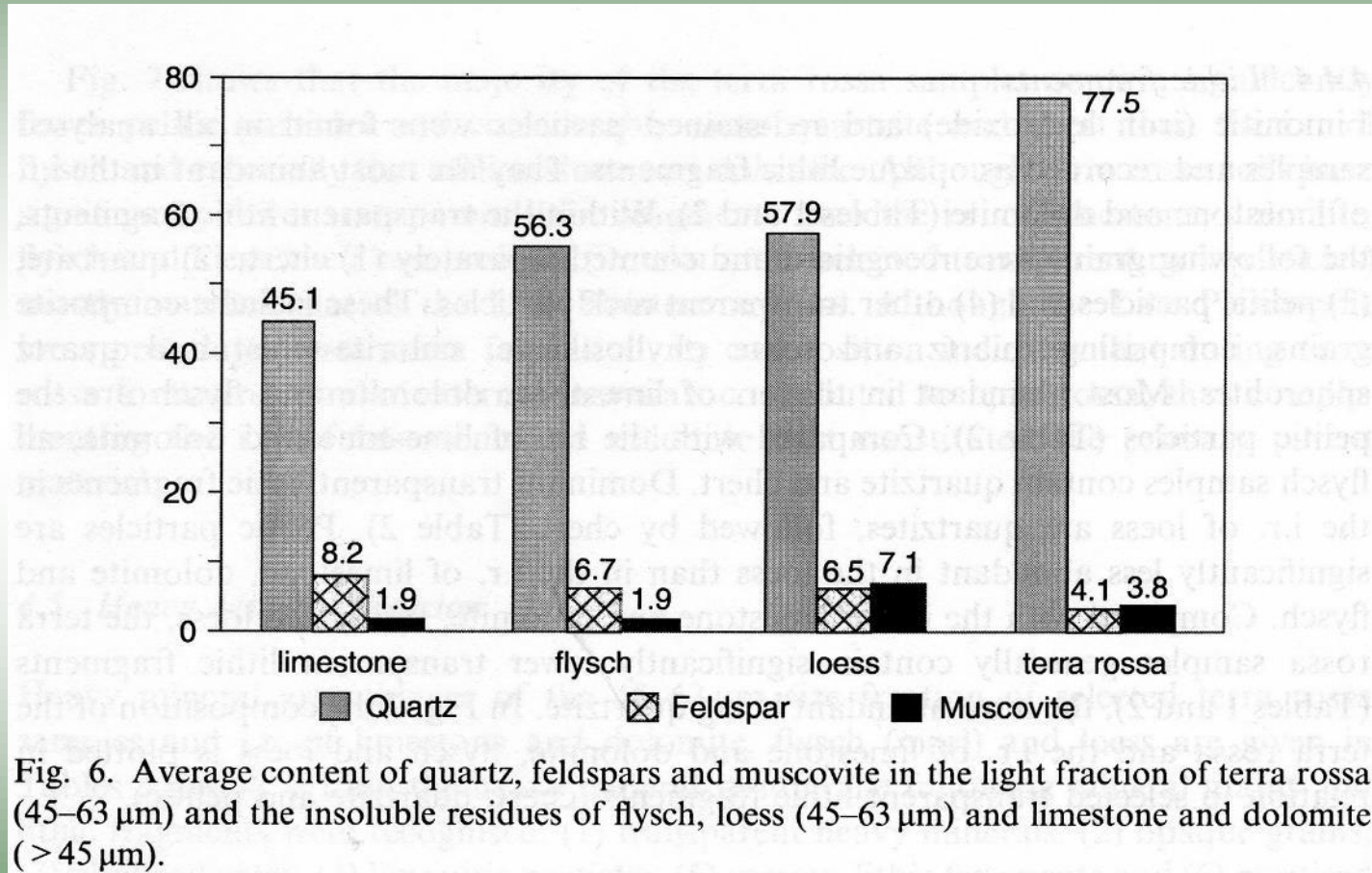
2020-2021

Carso B GFGeol -STAN

# terra rossa: il suolo più sviluppato negli ambienti carsici mediterranei



Anche se lo trovate scritto sui libri, non è solo il residuo insolubile dei calcari,



Rosso: ematite ossido di Fe

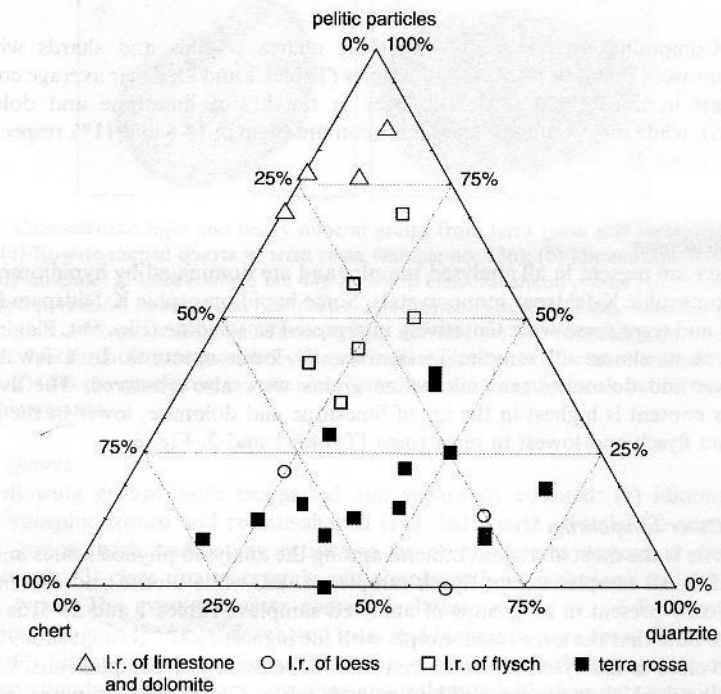


Fig. 7. Ternary diagram showing the relationship between the selected transparent rock particles (chert + quartzite + pelitic particles = 100%) in the terra rossa and insoluble residue of limestone and dolomite, flysch and loess.

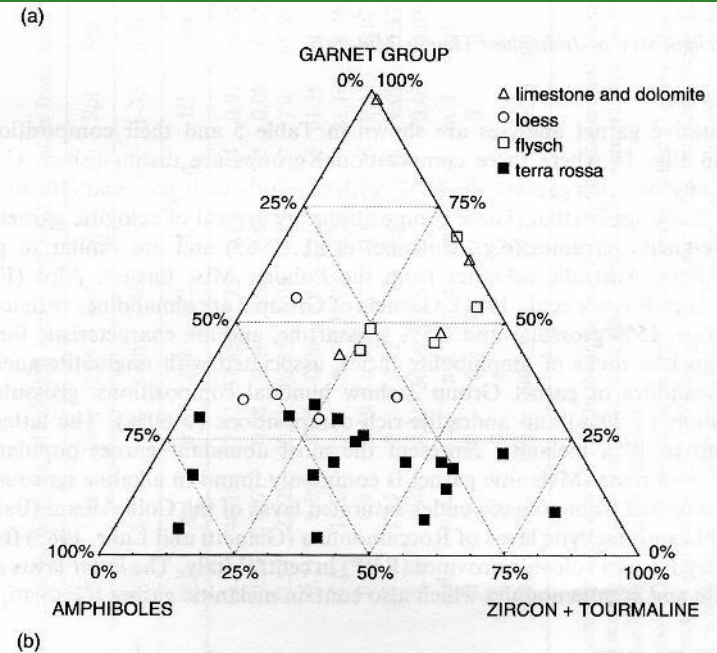


Fig. 9. (a) Ternary diagram showing the relationship between the proportions of garnet group vs. epidote group + amphiboles vs. zircon + tourmaline (= 100%) in terra rossa and insoluble residues of limestone and dolomite, flysch and loess; (b) ternary diagram showing the relationship between the proportions of garnet group vs. amphiboles vs. zircon + tourmaline (= 100%) in terra rossa and insoluble residues of limestone and dolomite, flysch and loess.

Terra rossa: suolo/paleosuolo poligenetico. Alla sua formazione contribuiscono polveri eoliche (loess), ceneri vulcaniche, e Soprattutto materiale clastico proveniente dal trasporto/alterazione di rocce ccome il Flysch. In certi casi (calcarei marnosi, impuri) anche il residuo della dissoluzione