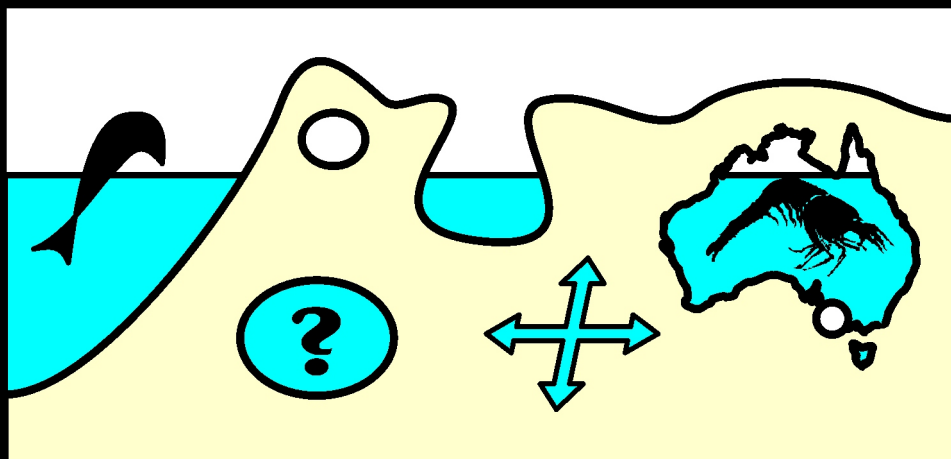


Geological Evolution of the Naracoorte Caves

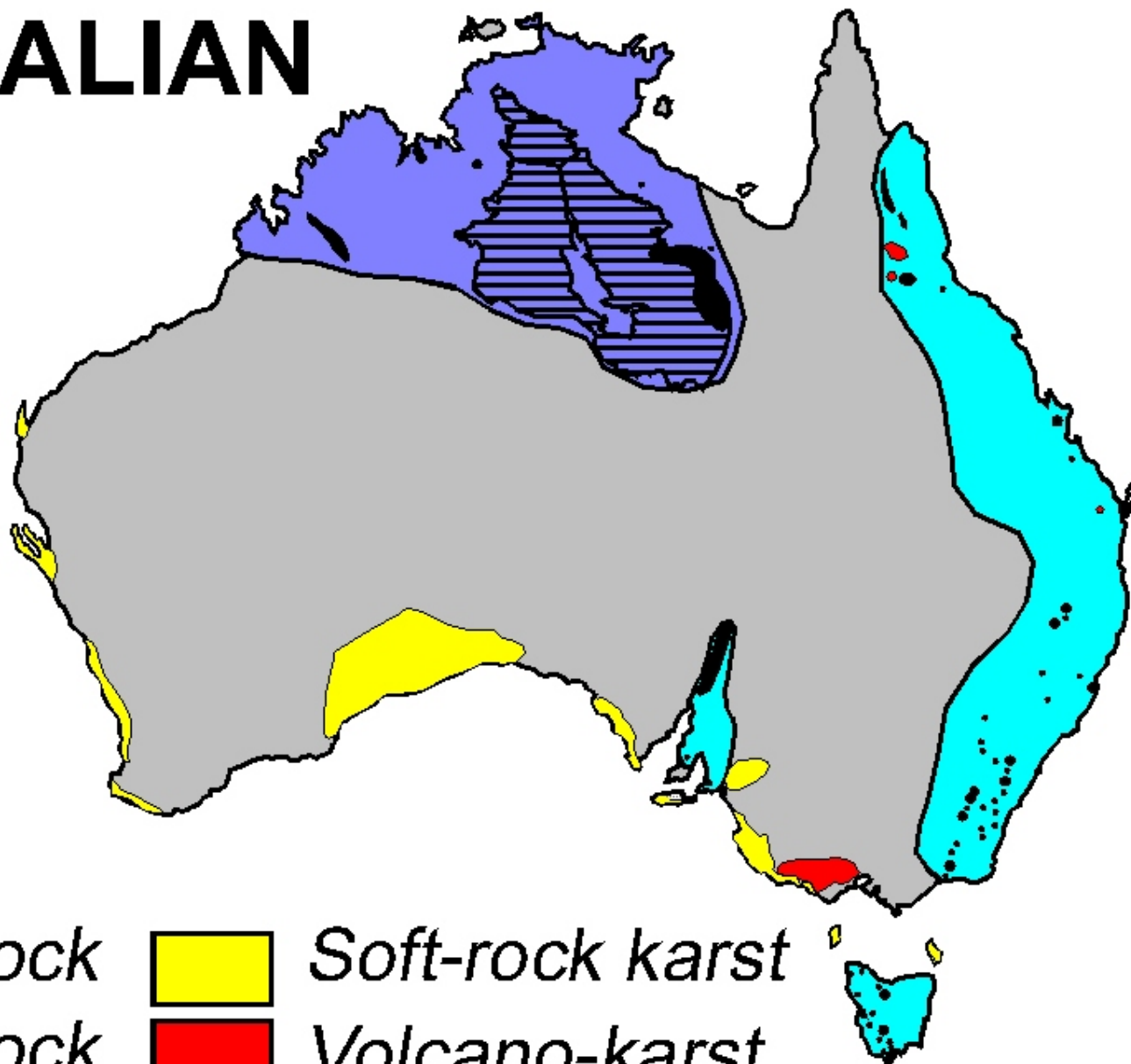
And the Gambier Karst Region in South Australia

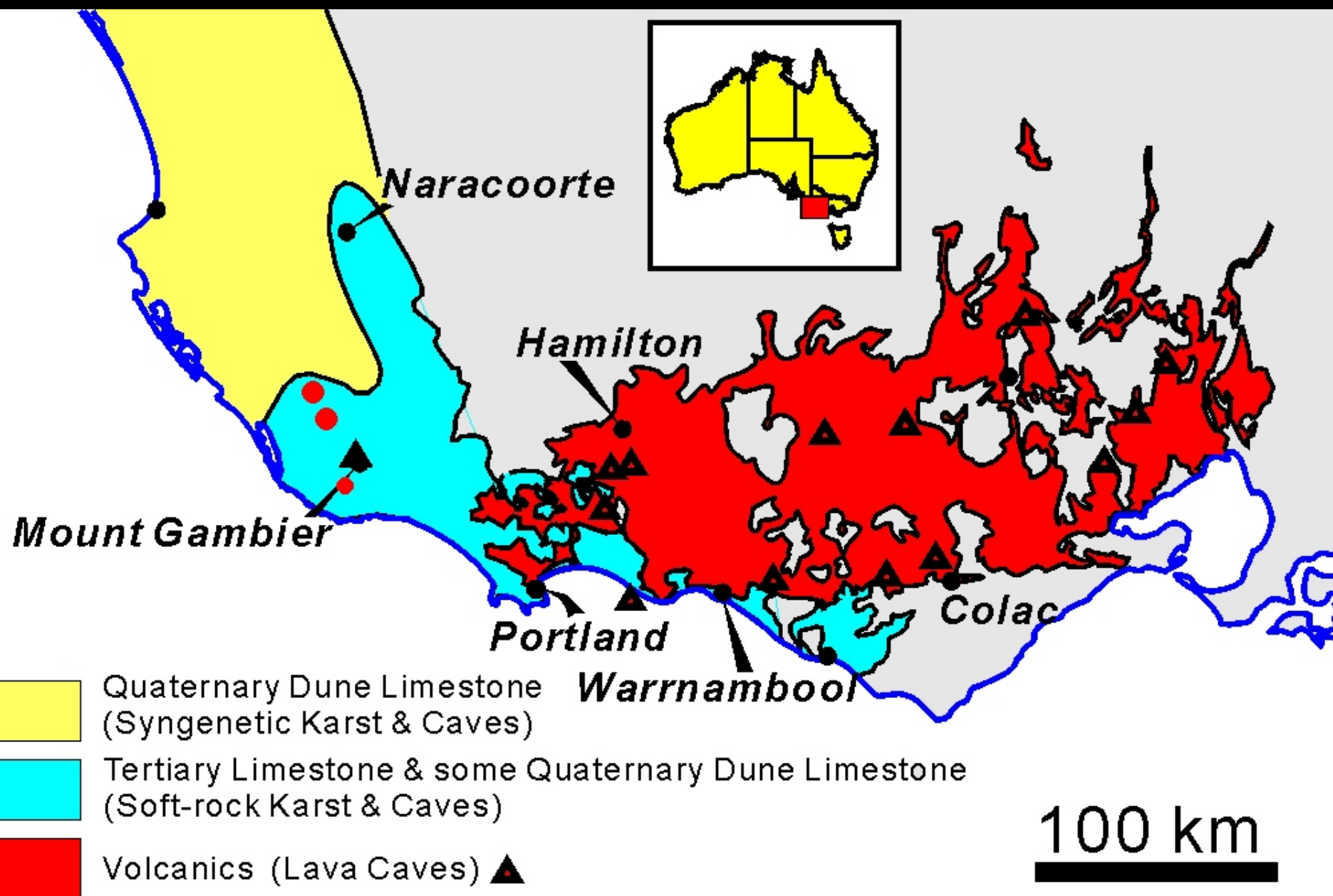
Ken G. Grimes



Limestone Coast 2004

AUSTRALIAN KARST



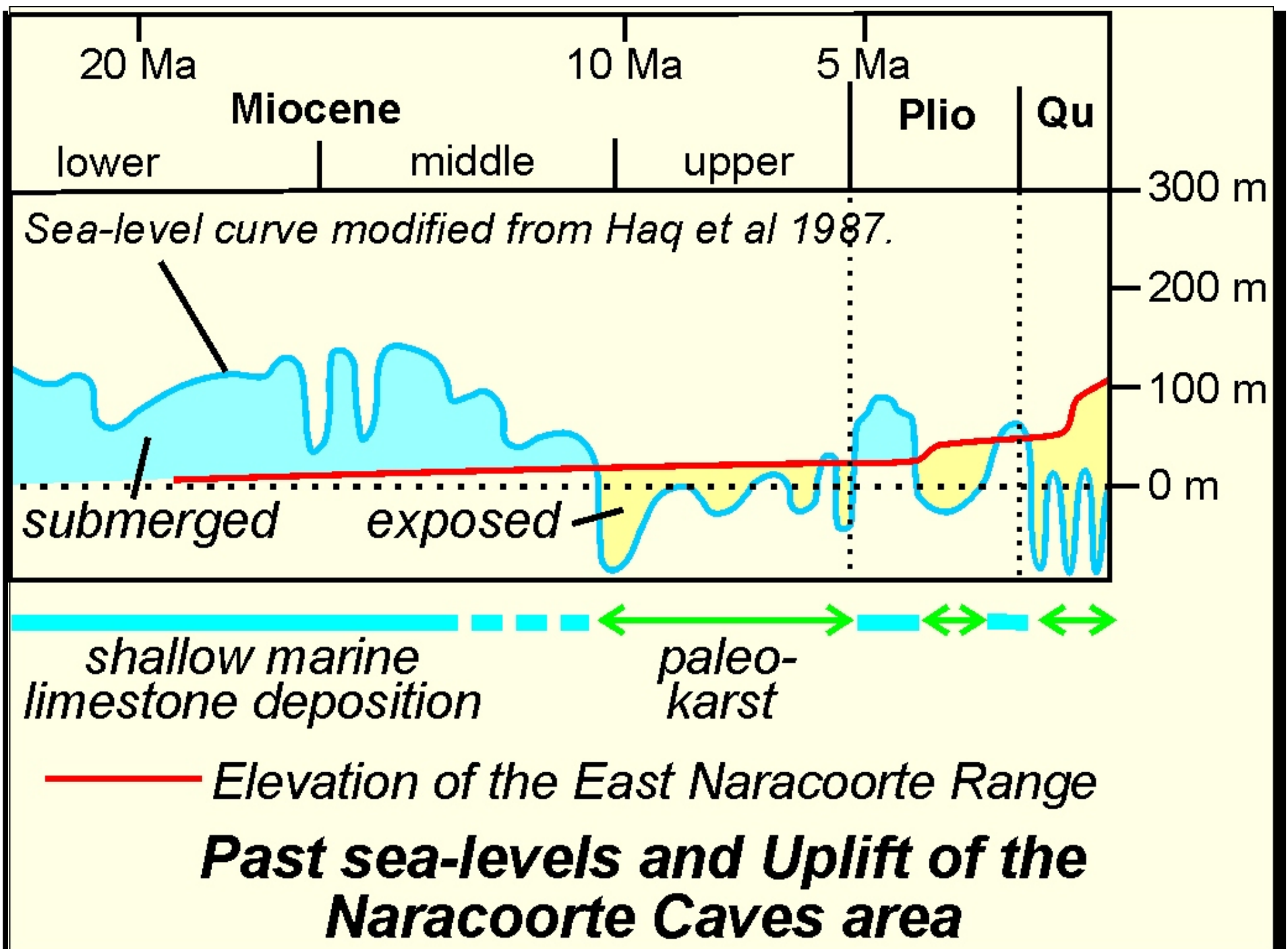


Geology of the South Australian part of the Gambier Karst Province



The Evolution of the Area *the main factors are ...*

- ▶ **Sea Level Change**
- ▶ **Ongoing Uplift**
- ▶ **Local Faulting**
- ▶ **Climatic change**

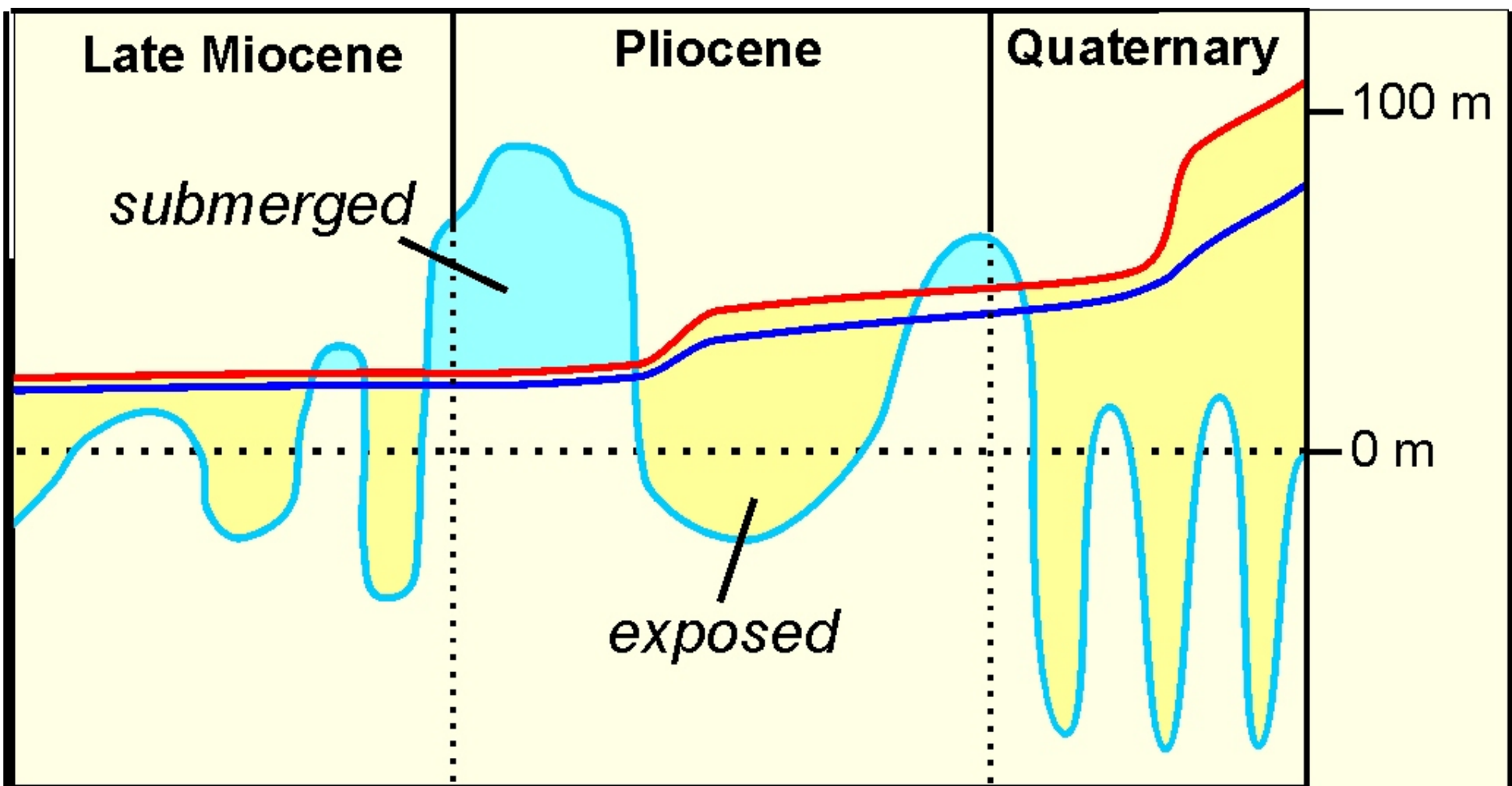


Whalers Bluff Paleokarst





Fox cave:
mud fill in
phreatic
spongework



- *Elevation of the East Naracoorte Range*
- *Watertable beneath the range*

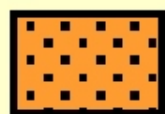
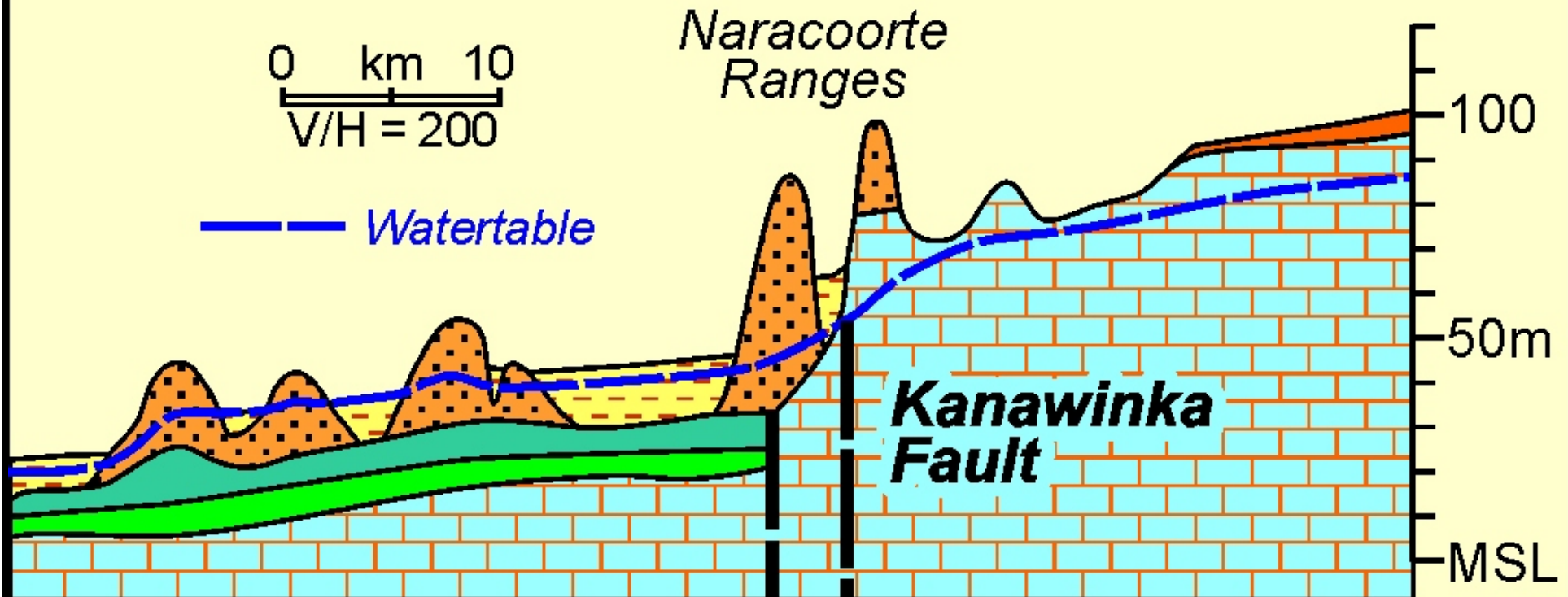
***Past sea-levels and Uplift of the
Naracoorte Caves area***

BOOL REGION

NARACOORTE PLATEAU

0 km 10
V/H = 200

— Watertable



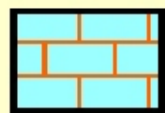
*Bridgewater Formation:
calcareous dune sand*



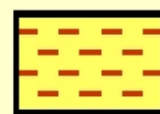
*Coomandook Formation:
calcareous quartz sand*



Loxton Sands



*Gambier Limestone:
calcarenite*



*Interdune flats:
lagoonal & alluvial
calcareous mud & sand*

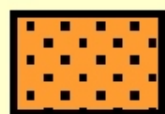
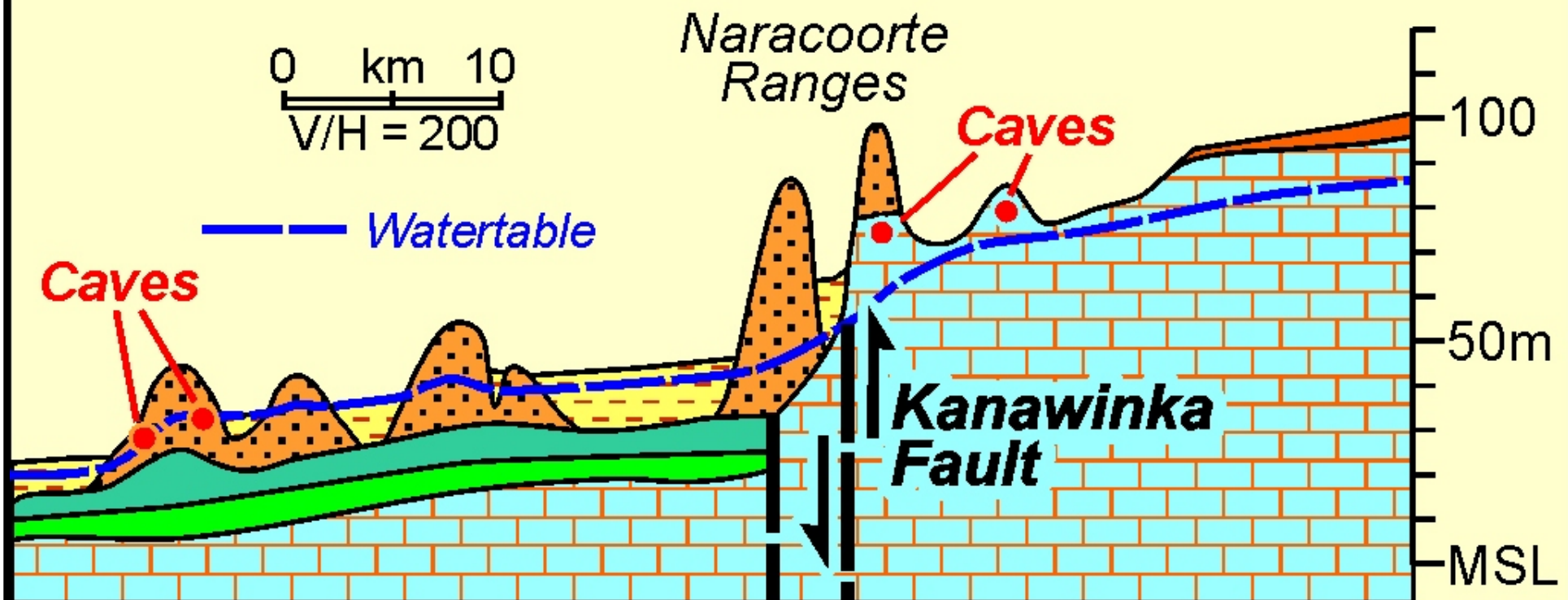


Parilla Sand

KGG, 2004

BOOL REGION

NARACOORTE PLATEAU



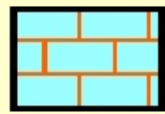
*Bridgewater Formation:
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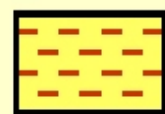
*Coomandook Formation:
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Loxton Sands



*Gambier Limestone:
calcarene*



*Interdune flats:
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calcareous mud & sand*

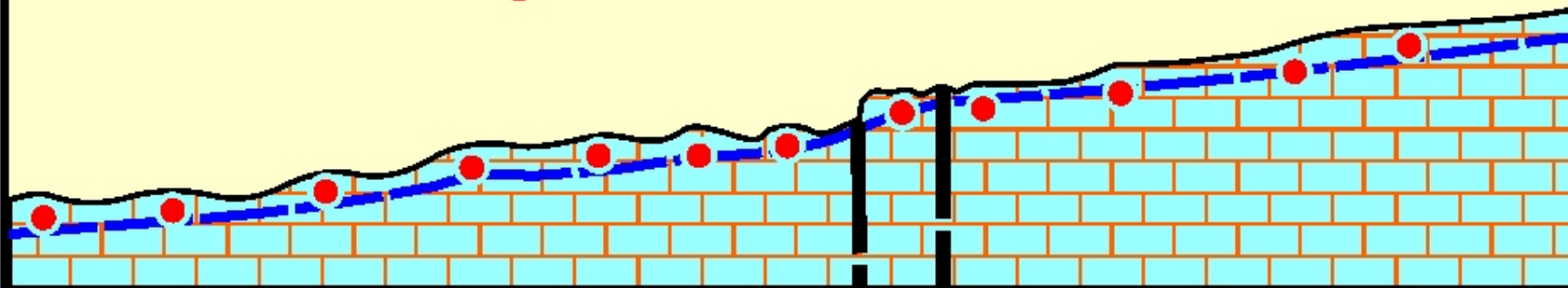


Parilla Sand

Late Miocene (karst weathering)

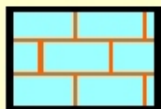
1

Early caves & karst ?



● ● Caves

— — Watertable

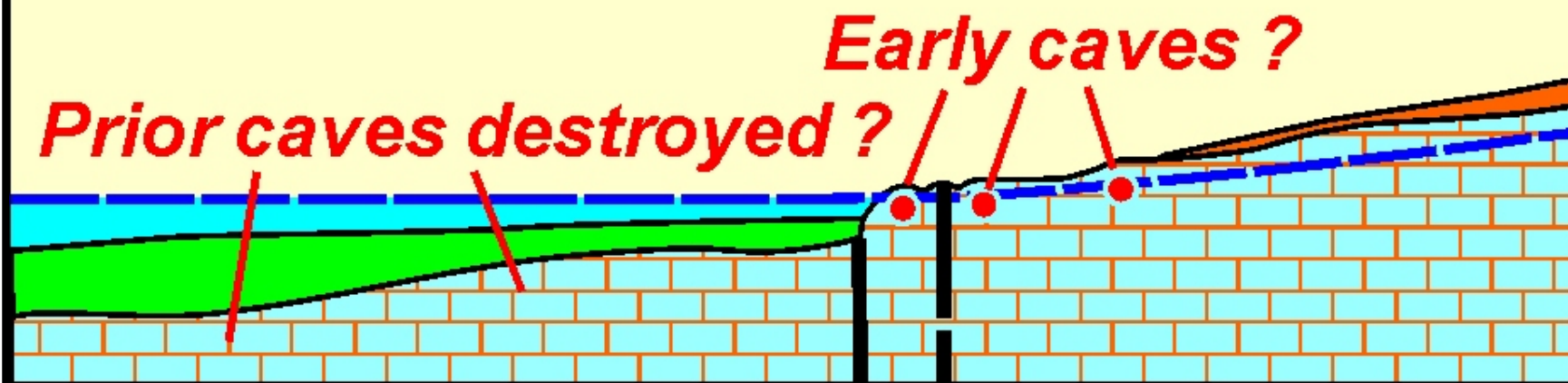


Gambier Limestone:
calcareenite

KGG, 2004

Early Pliocene (Loxton sea)

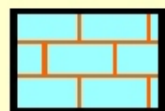
2



Loxton Sands



Parilla Sand



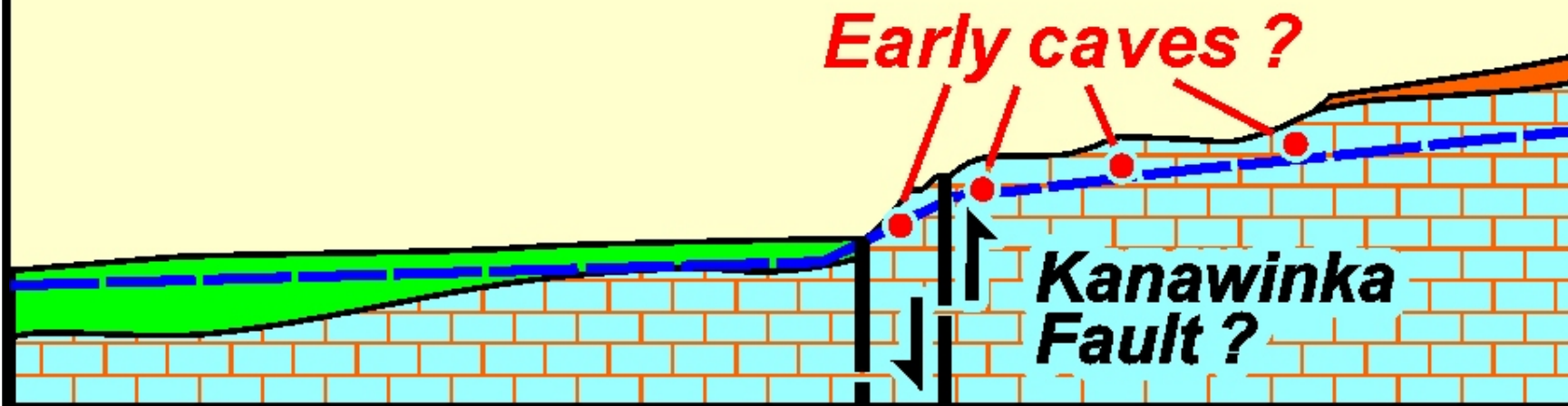
Gambier Limestone:
calcarenite

KGG, 2004

Mid-Pliocene (weathering & karst)

3

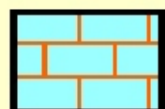
0 km 10
V/H = 200



Loxton Sands



Parilla Sand



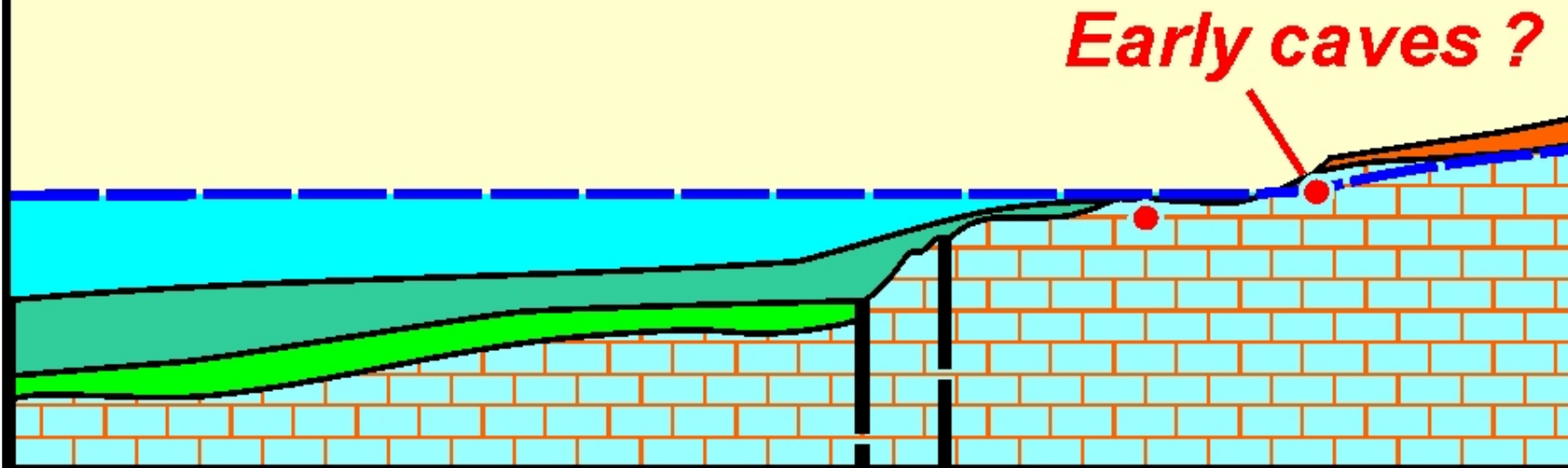
*Gambier Limestone:
calcarenite*

KGG, 2004

Plio-Pleistocene (Coomandook sea)

4

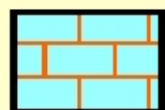
0 km 10
V/H = 200



Coomandook Formation:
calcareous quartz sand



Loxton Sands



Gambier Limestone:
calcarenite



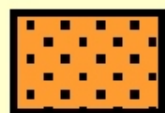
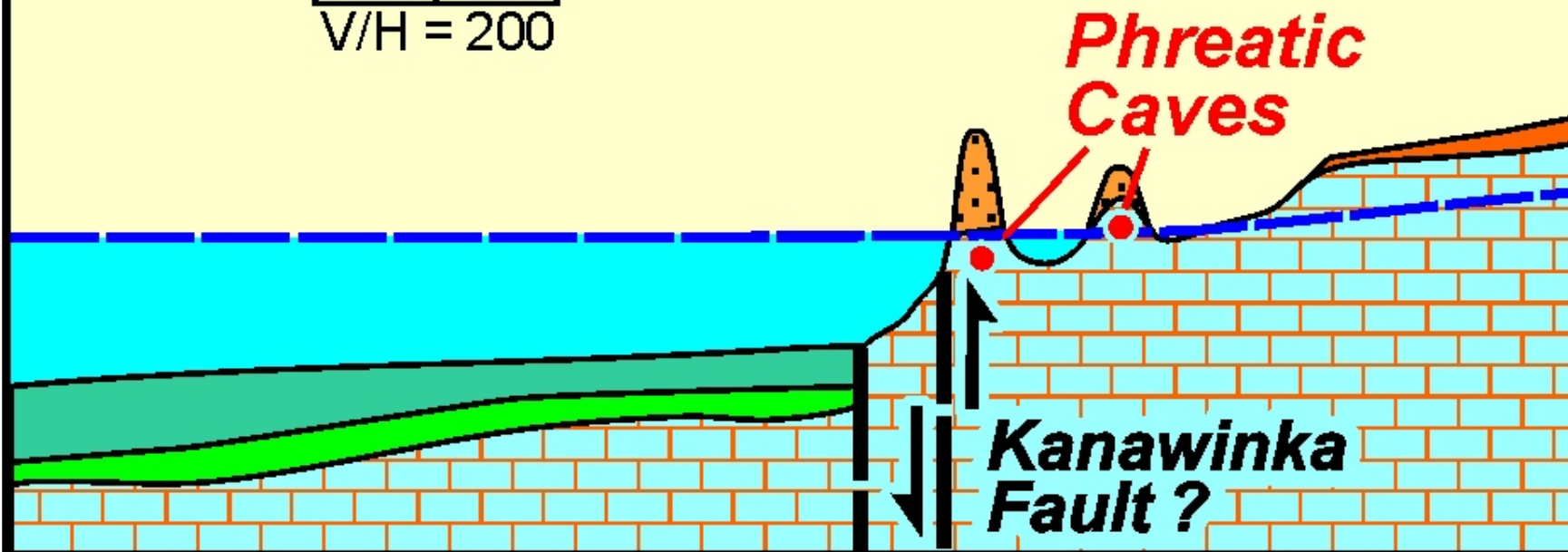
Parilla Sand

KGG, 2004

1.1 Ma (East Naracoorte shoreline)

5

0 km 10
V/H = 200



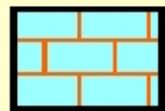
*Bridgewater Formation:
calcareous dune sand*



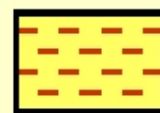
*Coomandook Formation:
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Loxton Sands



*Gambier Limestone:
calcarenite*



*Interdune flats:
lagoonal & alluvial
calcareous mud & sand*

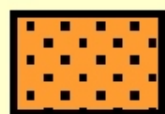
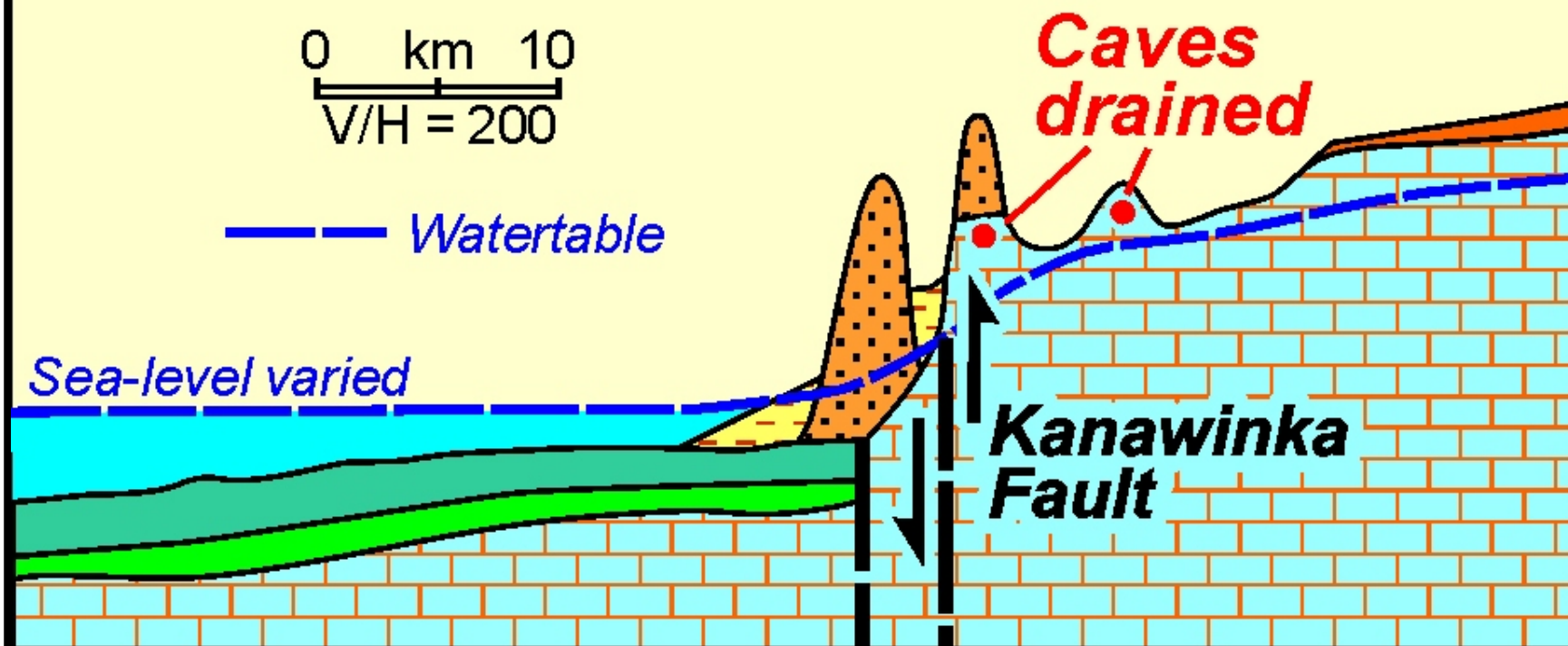


Parilla Sand

KGG, 2004

1000 - 700 ka (up-faulting)

6



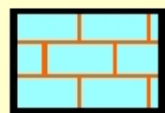
*Bridgewater Formation:
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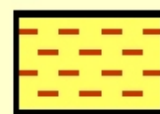
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Loxton Sands



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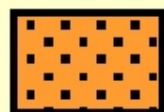
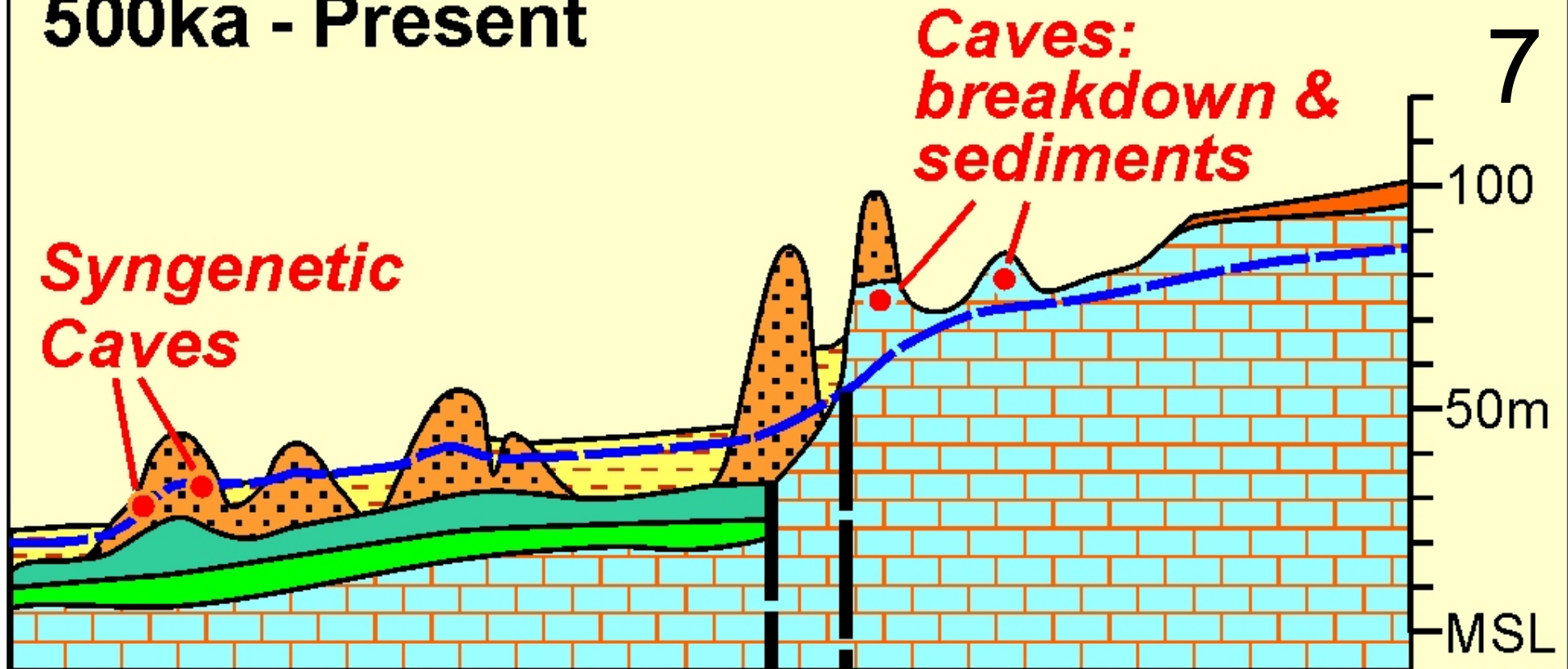
*Interdune flats:
lagoonal & alluvial
calcareous mud & sand*



Parilla Sand

KGG, 2004

500ka - Present



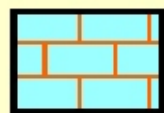
*Bridgewater Formation:
calcareous dune sand*



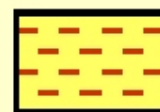
*Coomandook Formation:
calcareous quartz sand*



Loxton Sands



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*Interdune flats:
lagoonal & alluvial
calcareous mud & sand*



Parilla Sand

Meanwhile,

Elsewhere in the region...

★ Syngenetic Karst in Dune Ridges

★ Surface hollows, pans, dolines...

★ Coastal area

(Gambier Limestone, Water-table fluctuations)

▶ Flooded caves

▶ Cenotes

▶ Springs

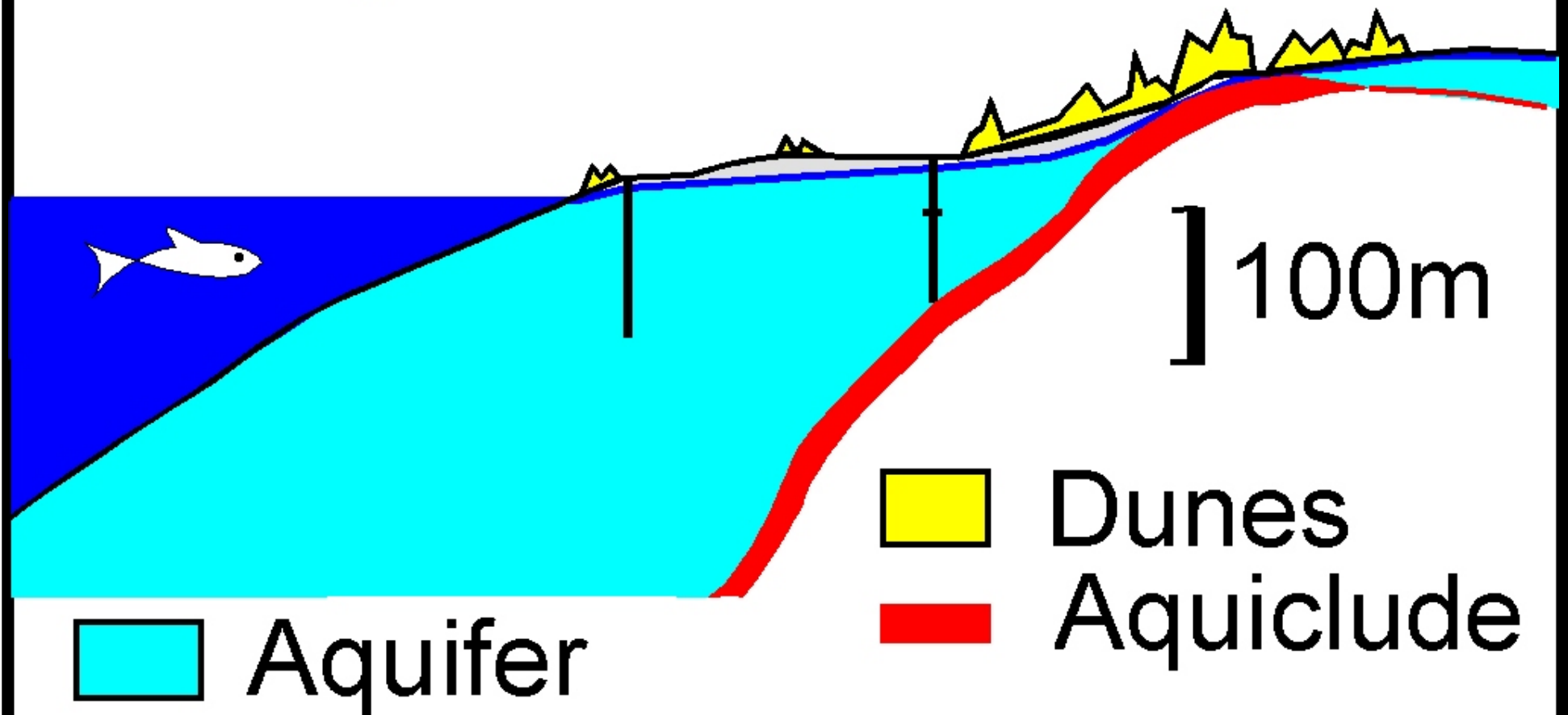
▶ Incised gorge of Glenelg River

Geology of the South Australian part of the Gambier Karst Province



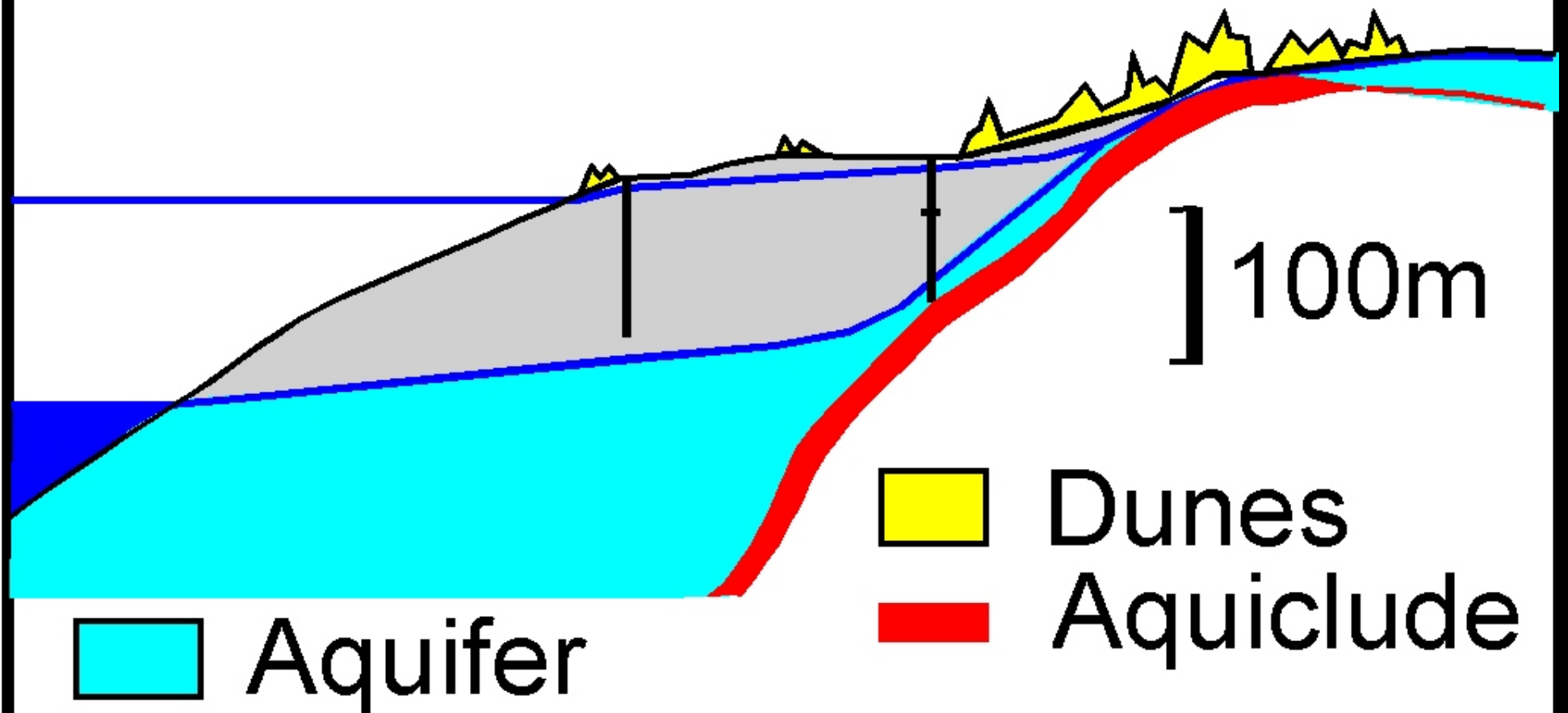
Past & Present Water Tables

Interglacial Levels



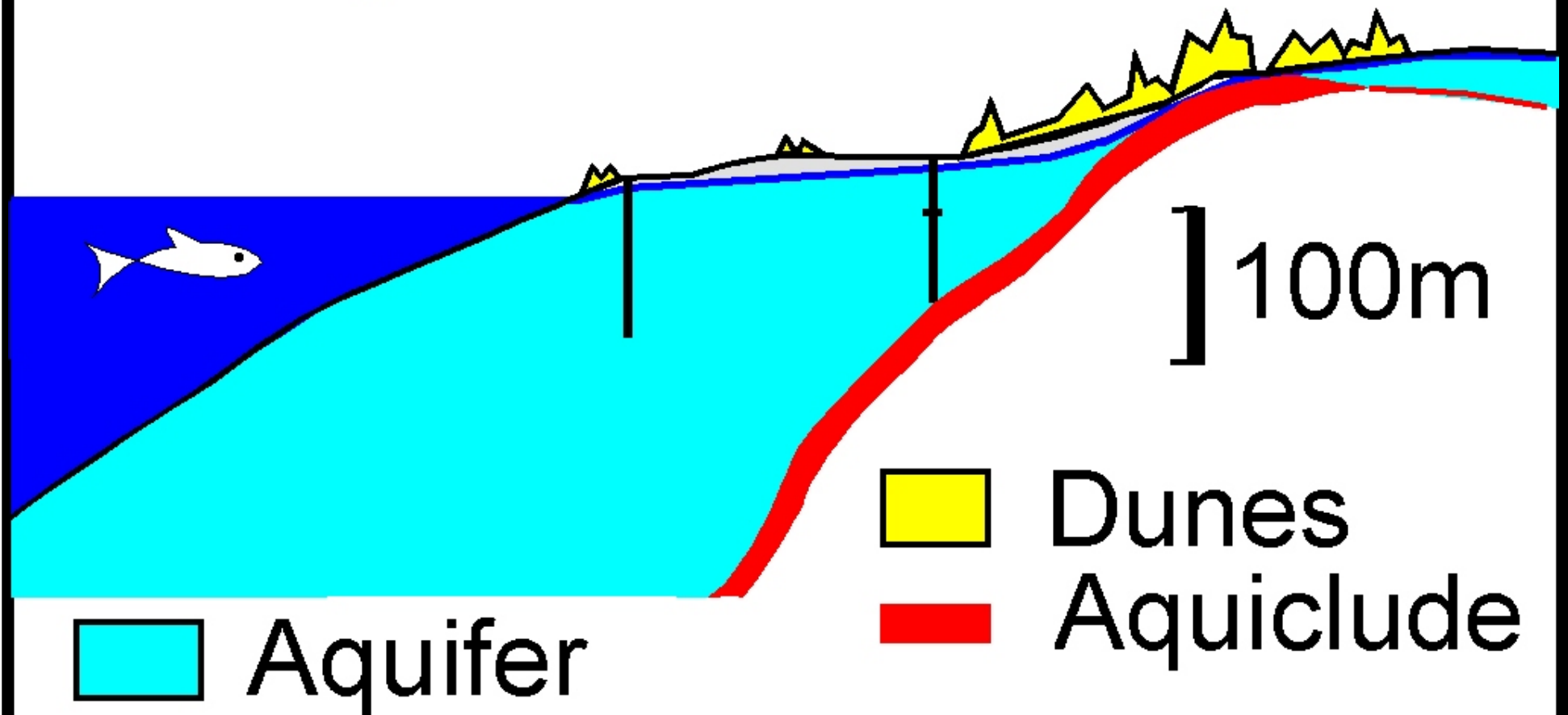
Past & Present Water Tables

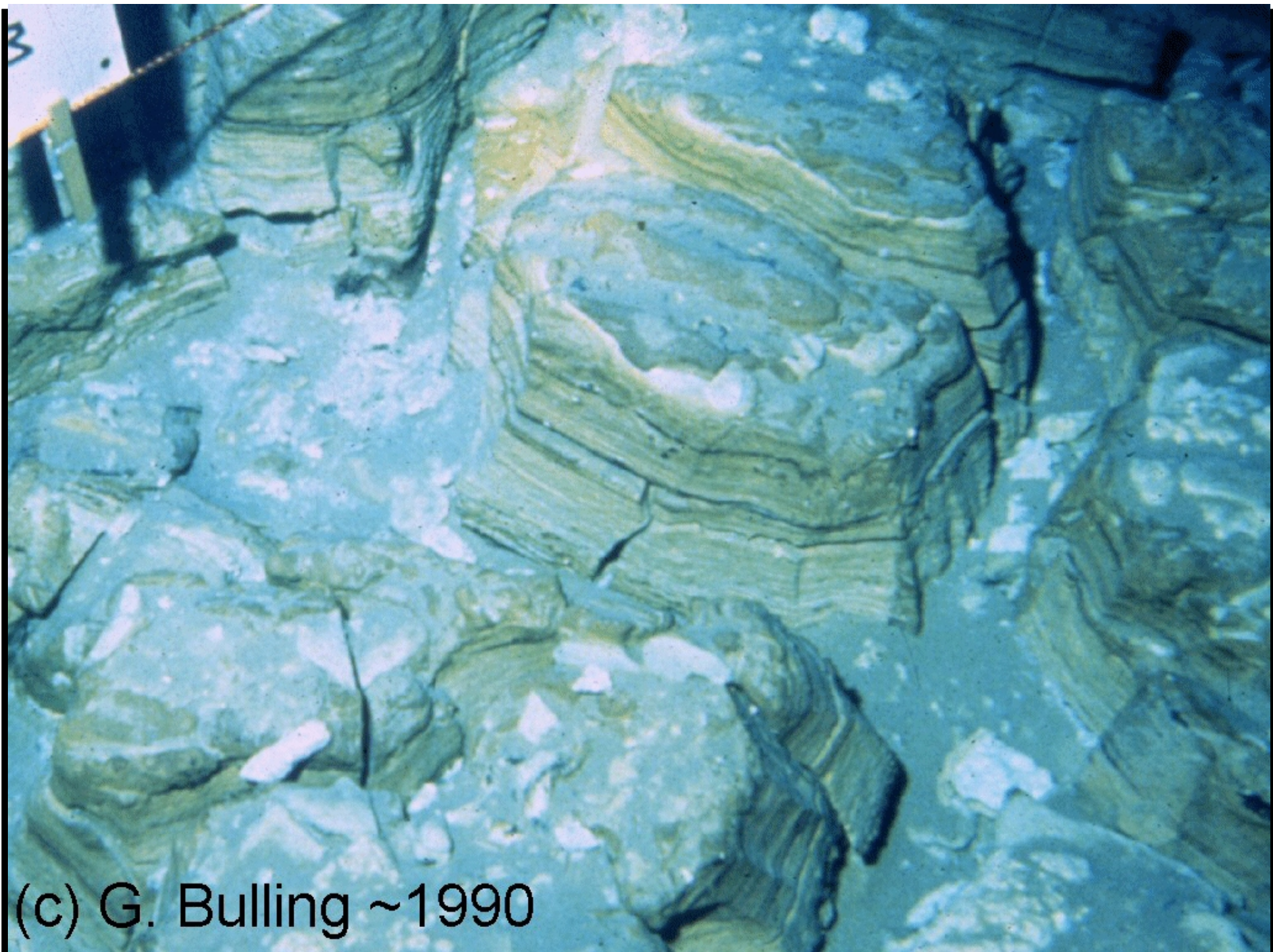
Glacial Levels



Past & Present Water Tables

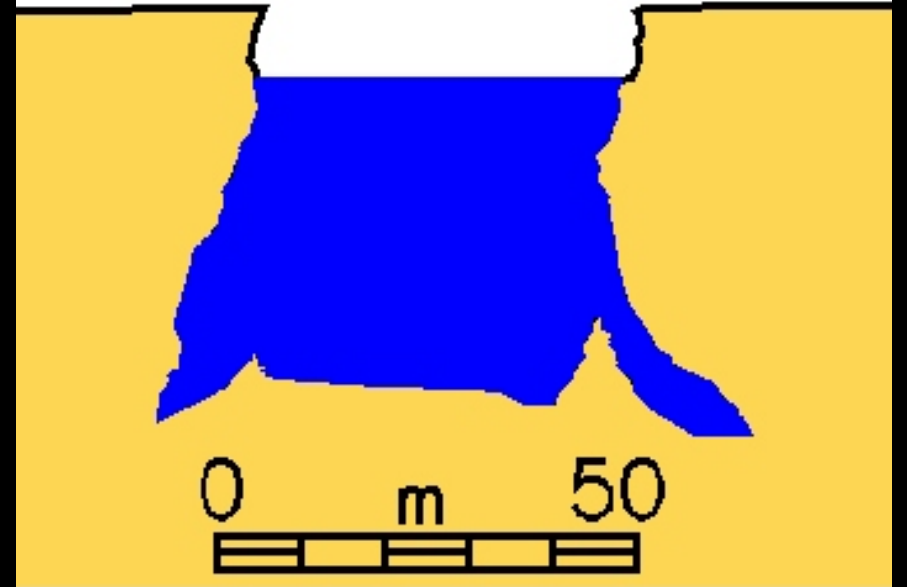
Interglacial Levels



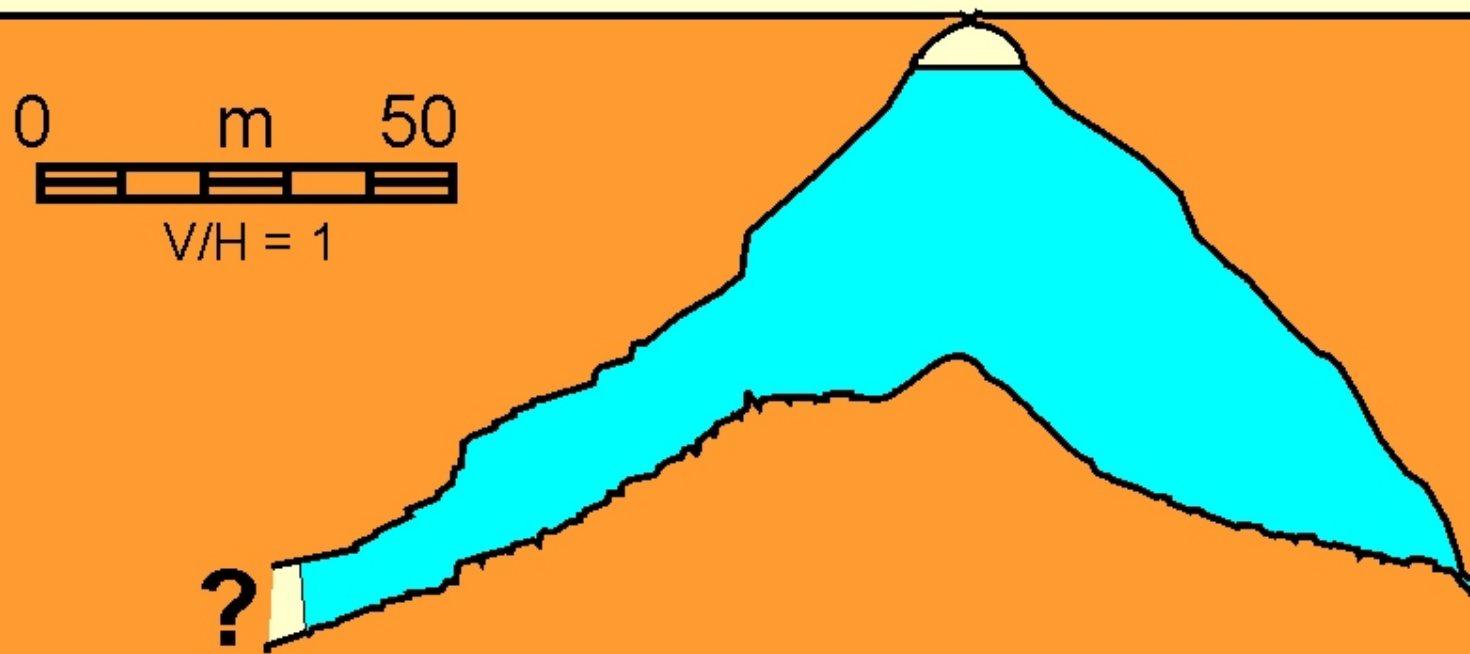


Cenotes

Little Blue Lake



The Shaft



**A large collapse dome
formed above a deep cave system
in the Mt. Gambier area**

Glenelg River Gorge

