

Pseudokarst - introduction

A talk to ASF conference, Chillagoe, April 2011

These are the speaker's prompt notes... but may be useful to interested people also.

Table of Terms

Showing the varied usages over time. There is still not a full consensus.

Bottom row = my suggested usage

Classifications of Karst, Parakarst & Pseudokarst									
Karst	Para-Karst	Hypo-Karst	Pseudo-Karst	Non-Karst	Solution Dominant	Chemical Weathering	Physical weathering & erosion	Phase change	Biol. Constructual
Limestone	Silts (Sand)	Quartz (slow)	Tafoni	Granite	Laterite	Water (slow)	Wind	Ice	Mass Movement
Swanson 1972									?
Oliver 1976									?
Cigna 1978 & IUS									?
Kempton & Halliday 1997			?	?	?	?	?	?	?
Way									?
Grimes, 1997									?
This Conference									

PARAKARST
* Silicate Karst
* Laterite karst
* Quartz Sandstone karst
* Other rocks (eg Granite karren, "volcanokarst", ...)
* Chemical weathering (more than just solution) = tafoni, granite, ...
PSEUDOKARST
* Hypokarst
* Lava caves (and other volc cavities)
* Glacier Caves (and ablation of snow)
* Thermokarst
* Sea caves
* Piping
* Wind erosion
* Mass movement (& tectonic movement)
* Biogenic (Burrowing & mining)
* Constructional Caves
POLYGENETIC
* Boulder caves (solution, weathering, mass movement, piping, ...)
* Tafoni (solution, chemical weathering, wind, gravity)
RUINIFORM Terrain
* Is NOT "karst-like".



The main Types

Parakarst in Australia is mainly Silicate karsts

* NB Distinction between Laterite K & Qtz Sstn K

Qtz sst is nearly monomineralic (SiO₂) and so only depauperate DWPs form

* Chemical Weathering includes a broad range of reactions & products, more than simple solution.

Pseudokarst

NB: difficult to classify the **Polygenetic** forms (eg Granite boulders)

Parakarst

= **Solution** is a significant (but not necessarily dominant) process.

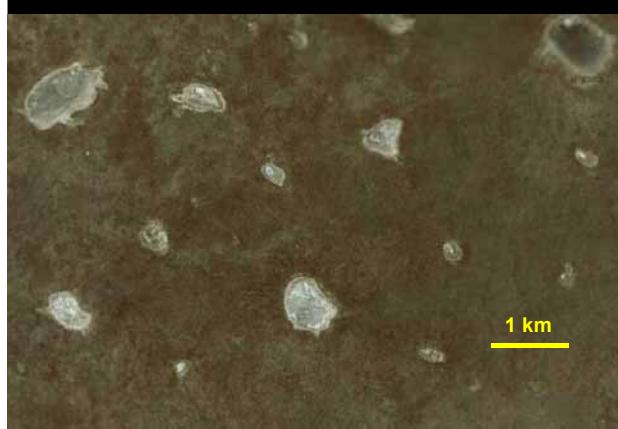
For Australia the **Surface** forms are perhaps more important than the caves ?

Q: What do we do with isolated surface features (eg a group of Pinnacles)?

Q: How much solution influence do we insist on to qualify?

Laterite Karst

Doomadgee Plain, Qld

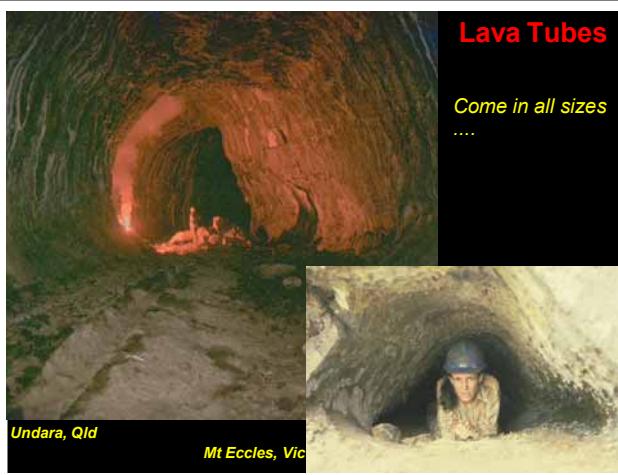


Laterite karst

Deep Weathering profiles (DWP)
= solution + other weathering processes and removal of soft material.

Various features at all scales

Caves are under the duricrust, and are generally small shelters, but a few complex ones occur.



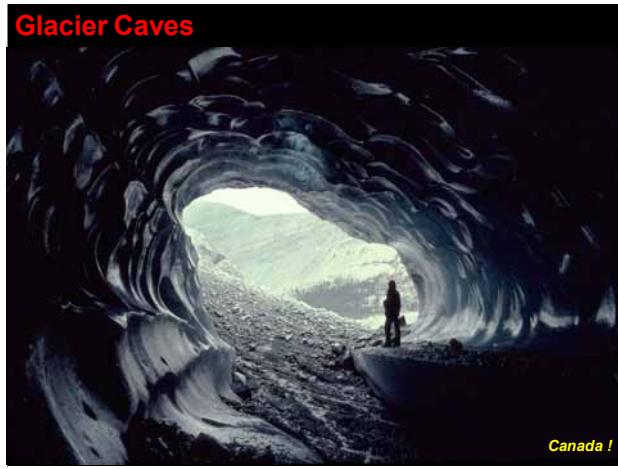
Lava Tubes

=Draining of liquid lava from beneath a solidified crust

A range of sizes and styles

Also other volcanic caves (eg open vents)

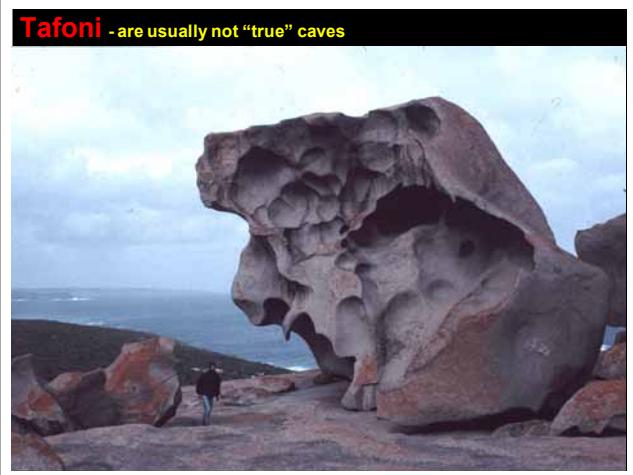
Glacier Caves



Glacier Caves

= Melting of Ice, plus sublimation.
Not in Australia, but Antarctica etc...

Tafoni - are usually not "true" caves



Tafoni:

=Weathering behind a case-hardened surface.

Almost always small "shelters" but a few "true" caves can occur.

Granite boulder caves

Labertouche, Vic

Sea Caves



Torres Strait, Qld

Granite Boulder Caves

= polygenetic !!!

= chem weathering (including Solution), piping and other mechanical removal of soft material.

= ALSO mass movement varieties (Talus caves)

Sea Caves

= Wave energy, possibly aided by chemical weathering

Most are small

Some have associated UG drainage, dolines etc.

Piping Caves

Mt Gravatt, Qld

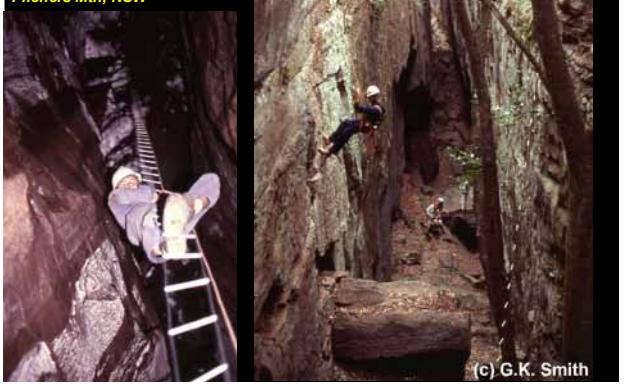


Piping Caves

= Groundwater carries fine clays etc
Also Spring sapping
Mostly small tunnels, but some larger ones. May have assoc UG drainage, dolines etc.

Mass Movement Fissure Caves

Pitchers Mtn, NSW



Mass Movement

= Fissures opened up by block sliding etc.
= Also Tectonic movements
= Talus caves are a type of "boulder" cave.

Biologically formed Caves (Homokarst?)

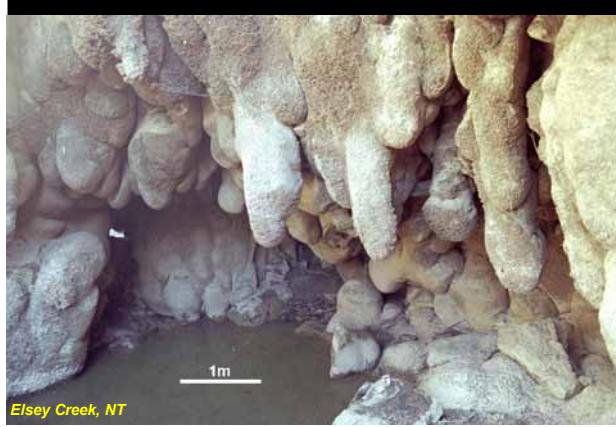


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BioKarst (?)

Animals: digging, eating, ...
Humans: Mining, Drains, Military, etc.
May produce major subsidence to form sinkholes etc on surface.
Old mines can have oddball speleothems.

Constructional Caves (Tufa Cave)



Constructional Caves

= Build up of material encloses a space to form a cave
eg Tufa Caves (behind waterfalls or in ponds)

The main diagram again
... for discussion ...

Classifications of Karst, Parakarst & Pseudokarst

	Karst	Para-Karst	Hypo-Karst	Pseudo-Karst	Non-Karst	
	Solution Dominant	Chemical Weathering	Physical weathering & erosion	Phase change	Mass Movement	Biot. Constructional
Swedling 1972	Limestone	Salt (fast)	Quartz (slow)	Water (fast)	Wind	Ice Snow
Olivos 1978						
Cigna 1978 & IUS		Green				
Kempe & Halliday 1997			?	?	?	?
Wray			?	?	?	?
Grimes 1997		Green				
This Conference		Green				