Whalemouth Cave, WA

An example of Tropical Sandstone Karst

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Whalemouth Cave is a large through-flow stream cave developed in quartz sandstone in tropical Australia. It is the biggest and best known development of a silicate karst cave in Australia, and significant at a world scale. The downstream entrance is a 60m high hole in a 150 m high red sandstone cliff (see photo). The upstream entrance is in a doline and takes water from a 2.5 km surface valley on the plateau (Jennings, 1983).

Location:

Whalemouth Cave is in the Osmond Range of Western Australia, about 20 km NW of the Bungle Bungles.

Geological Setting:

The cave is formed at the edge of a plateau of the Proterozoic Mt Parker Formation – a hard, fine to coarse-grained, quartz sandstone, pebbly sandstone and conglomerate (Tyler et al, 1998 - Dixon Range 1:250,000 geological map (second edition)). The beds dip to the northwest at between 20 and 30 degrees, and have a strong vertical jointing which is followed by the cave. In the valley to the NW, there is an older unit of basaltic volcanics, up-faulted against the sandstone. Jennings (1983) reports that the sandstone is a quartzite with interlinking quartz grains.

Geomorphology:

The cave has captured the surface flow of the plateau valley via a doline that feeds into the cave. The original valley continues as a dry valley, or wind gap, 30-40 m above the doline floor and connects to another valley that leaves the plateau via a narrow gorge. The cave itself is a descending fissure about 220m long, with a series of vertical falls separated by plunge pools up to 4 m deep and rubble mounds. A side passage adds another 50m to the cave length. The vertical extent is about 120 m. There is obviously a strong flow during the wet season, but the dry season stream is small. Access is difficult and requires ropes and swimming.

Elsewhere on the plateau Jennings (1983) reported stone cities, and blind valleys and sinkholes are shown on the 1:50,000 topo map.

Speleogenesis:

This is a silicate karst, or parakarst. The quartz sand has been partly dissolved slowly, over a long period of time, possibly during times of higher rainfall in the Tertiary. One suggestion is that the solution was initially along the grain boundaries, leaving loose sand grains which could be easily washed away by underground streams (Jennings, 1983; Young, 1988).

References:

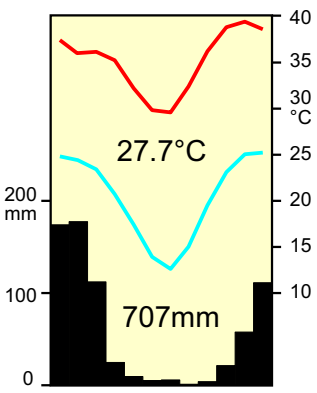
Jennings, J.N., 1983: Sandstone Pseudokarst or Karst? in R.W.,Young & G.C. Nanson (eds) Aspects of Australian Sandstone Landscapes. *Australian & New Zealand Geomorphology Group Special Publication, No* **1**. pp. 21-30.

Young, R.W., 1988: Quartz etching and sandstone karst: examples from the East Kimberleys, northwestern Australia. *Zeitschrift fur Geomorphologie*. **32:** 409-423.

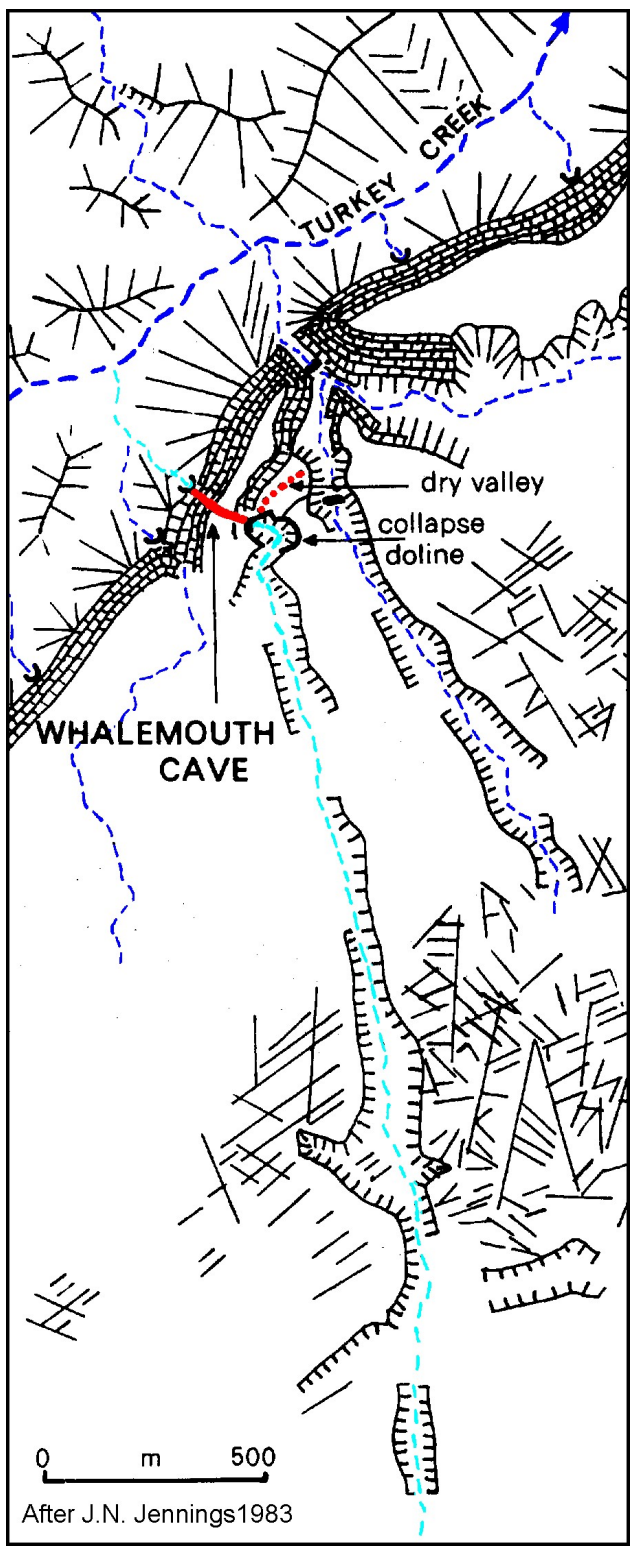
↑ ***The large down-stream entrance of Whalemouth Cave, in a 150m high sand-stone cliff. Note outflow stream channel***

Climate

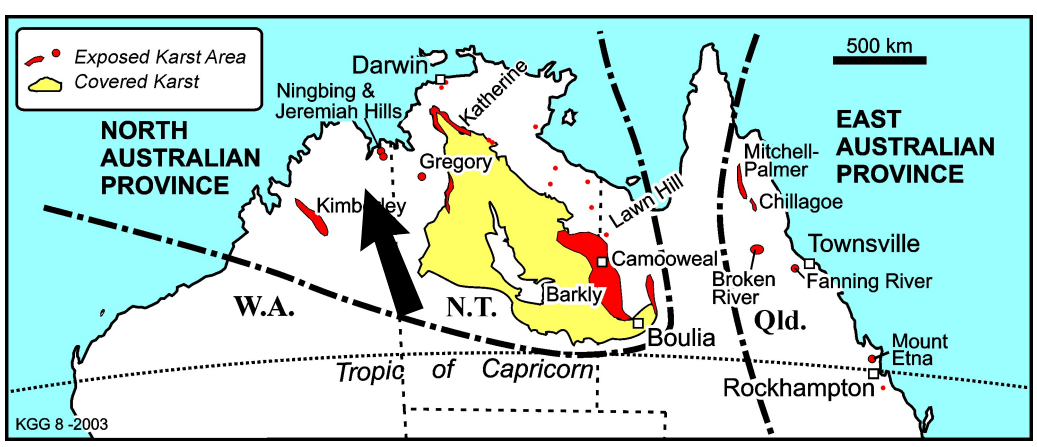
The area has a tropical semi-arid monsoon climate (BShw on the Köppen scheme) with an annual rainfall of about 700 mm falling in pronounced wet and dry seasons. Monthly mean maximum and minimum temperature and rainfall variations are shown for Warmun, 25km to the North.



Warmun



After J.N. Jennings1983



← *Upstream doline and stream-sink.*

⬆ *View out of the upper part of the downstream entrance. The lower stream fissure is out of sight.*

⬇ *Looking into the fissure passage behind the main, downstream, chamber.*