Sandstone Karst & Caves

With particular reference to the Blue Mountains, NSW

AUSTRALIAN SPELEOLOGICAL FEDERATION
PROCEEDINGS 10TH BIENNIAL CONFERENCE

SECTION 2
GEOLOGY AND GEOMORPHOLOGY - PSEUDOKARST

PSEUDOKARST: DEFINITION AND TYPES

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ABSTRACT

Pseudokarst is a karst morphology produced by non-solutional processes. It does not include solutional features in non-limestone rocks which are here included in true karst. Pseudokarst processes include a variety of mechanical agencies

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SANDSTONE PSEUDOKARST OR KARST?

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Solutional landforms in quartz sandstones of the Sydney Basin.

PhD thesis. University of Wollongong, Australia.

Solutional Landforms on Silicates; largely ignored or largely unrecognised?

Robert Wray.
Department of Geography, University of Wollongong.

Wray R.A.L.
2003

Quartzite dissolution: karst or pseudokarst?

re-published from: Cave and Karst Science 24 (2), 1997, 81-86.

Reference: **Wray R A. L.** [illegible]. Quartzite dissolution: karst or pseudokarst? / Speleogenesis and Evolution of Karst Aquifers 1 (2), www.speleogenesis.info , 9 pages, **re-published from:** Cave and Karst Science 24 (2), 1997, 81-86.

Abstract: A wide range of landforms of great similarity to limestone karst is found on many of the world's quartz sandstones and quartzites. These landforms have often been dismissed as pseudokarst, but recent investigation shows that the dissolutional removal of silica, even quartz, under earth-surface conditions is a critical process in their formation. They must therefore be regarded as true karst features. Recognition of these genetically similar forms on

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KARST ON QUARTZOSE ROCKS: A MAJOR PROBLEM IN TROPICAL GEOGRAPHY

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Part 1: Sandstone Karst

Wide variety of karst-like landforms : towers, grikes, bedrock arches, solution basins (kamenitsa), underground rivers, caves & some silica or (rarely) carbonate speleothems

Pagodas = towers

Gnammas = kamenitsa

“pagodas” or pedestals” analogous to small karst towers

Honeycomb weathering analogous To tafoni

gnammas analogous to Kamenitsa

Deep *kluftkarren* or crevasses

Phu Hin Rong Kla National Park, Thailand

Small scale karst features on sandstone in north-east Thailand

Sandstone caves often described erroneously as wind-eroded and/or pseudo-karst,

Most sandstone caves initiate or develop at least partly by processes of dissolution, and are now regarded as karst features.

Presence of salt accelerates silica disaggregation - is a major factor in cavernous weathering especially near the sea

Insoluble residue usually great than from limestone

Mechanical weathering and gravitational processes more significant than in limestone but vary widely in their influence in particular caves

A largely descriptive and genetic classification is suggested.

Part 2: Significance of sandstone caves

Numerous sites of aboriginal significance

Red Hand Cave, Glenbrook

Geological significance:

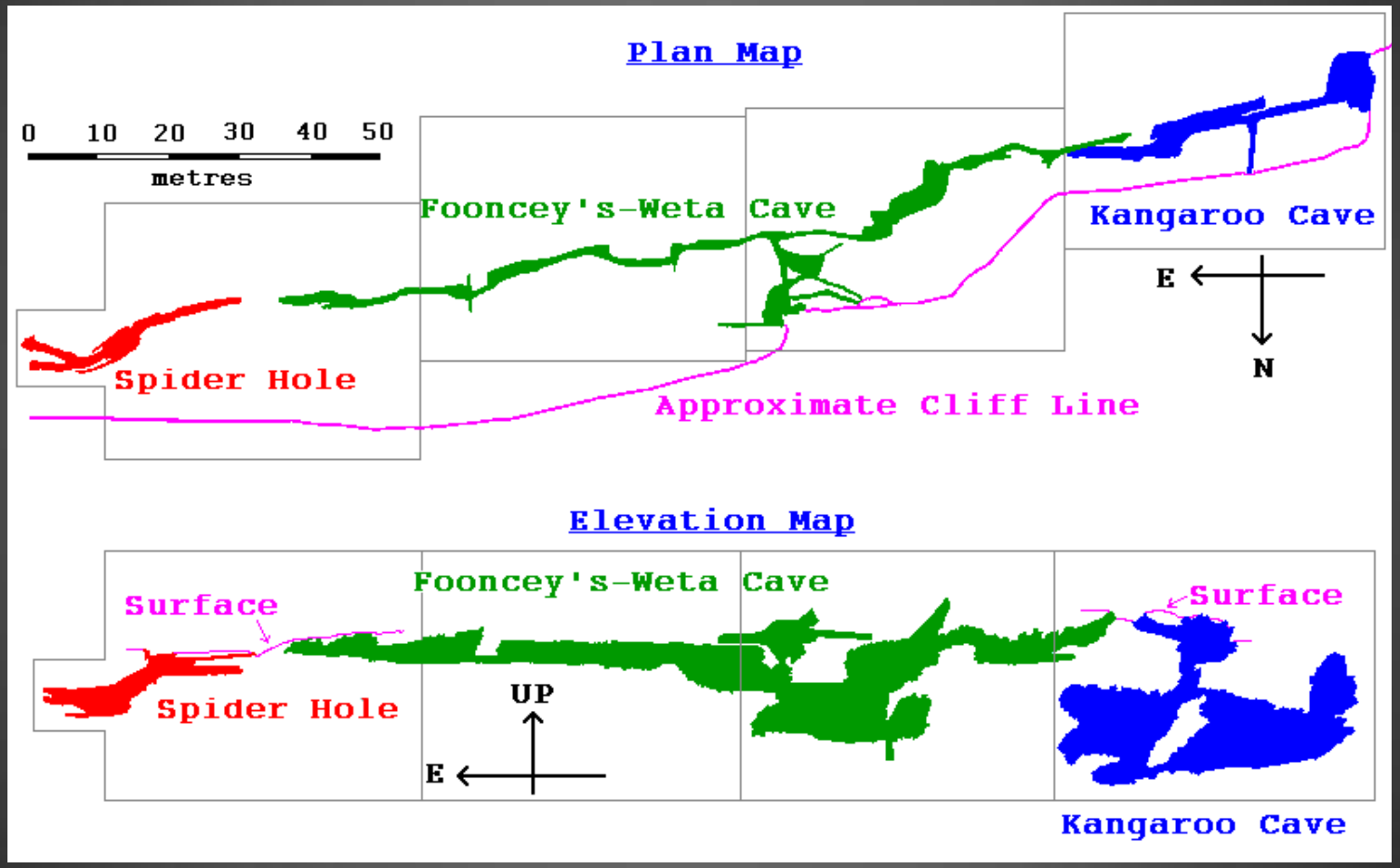
Cave in cross-bedded sandstone in north-west NSW, the exterior of which is protected by case-hardening, but with a readily eroded interior


Historical significance:
Baralliers Cave, recorded in 1802 in an early attempt to cross the Mountains

Part 3: Types of Sandstone Caves

1. Block-gliding Caves Nangwarry Caves

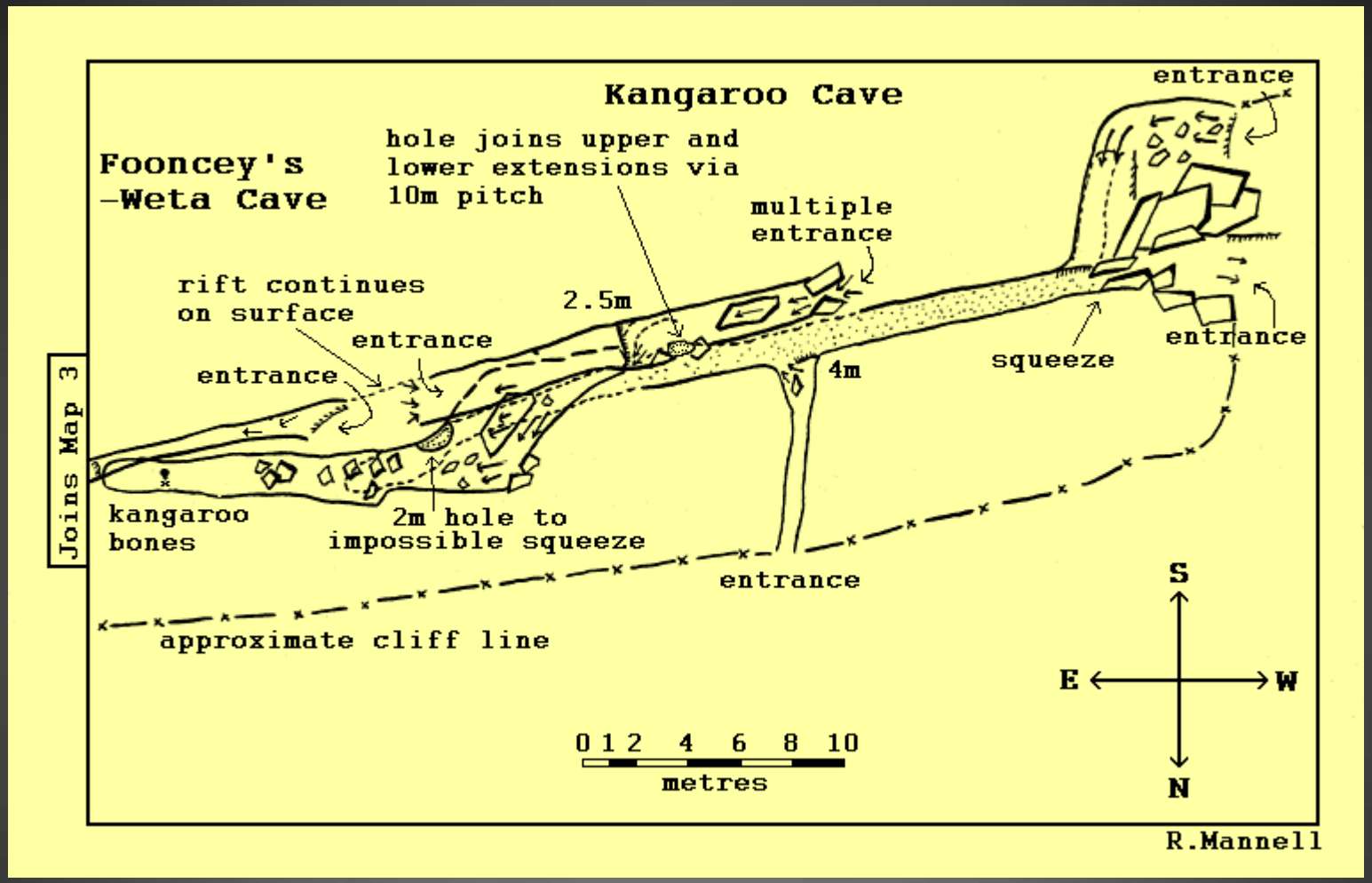
(Block-gliding near cliff edge, solution relatively minor factor)



Initiation by solutional widening of joints, otherwise mechanical development

Most common in the Nowra Sandstone, south of Kangaroo Valley & Nowra

Drawn 7/10/73 by Robert Mannell



Kangaroo Cave, a block-gliding cave in the Nowra Sandstone, part of a 400m+ long interconnected cave system parallel to cliff-line near Shoalhaven River

2. Differential weathering producing undercuts

Walls Cave (Blackheath)

3. Lateral incision by streams

Forestville Cave

Engineers Cascade Cave, Mt Victoria

Engineers Cascade Cave

Mermaids Cave, Blackheath

Lateral incision by streams & retreat of waterfalls

Ross Cave, Mt Victoria

Underground River, Blackheath

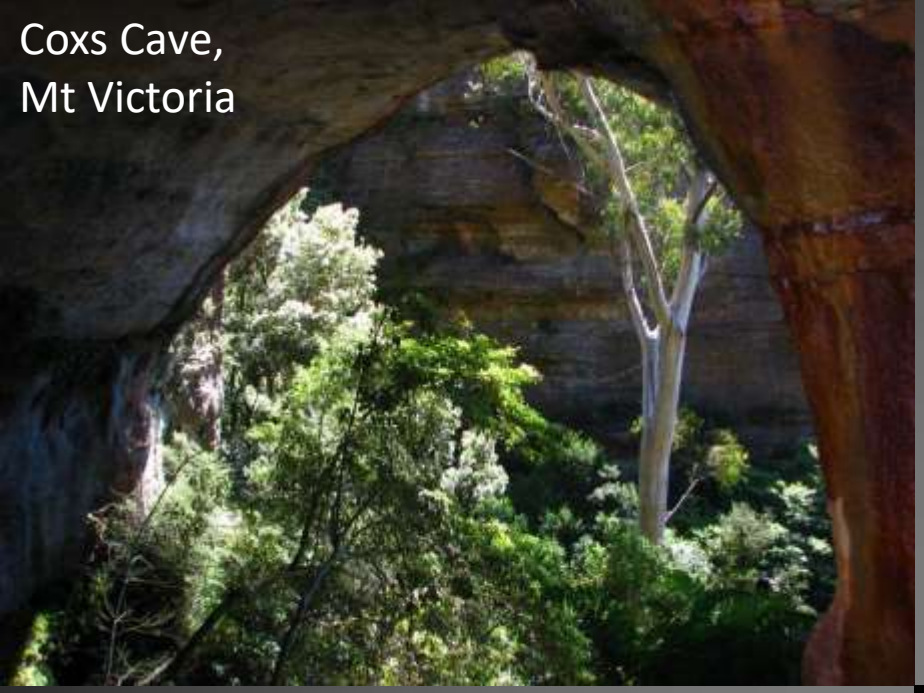
Also Hill Top Cave (nr. Mittagong)

4. Primarily stream solution caves?


Ross Cave, Mt Victoria

5. Caves initiated by vertical jointing

Appear to be particularly common around Mt Victoria



Coxs Cave,
Mt Victoria

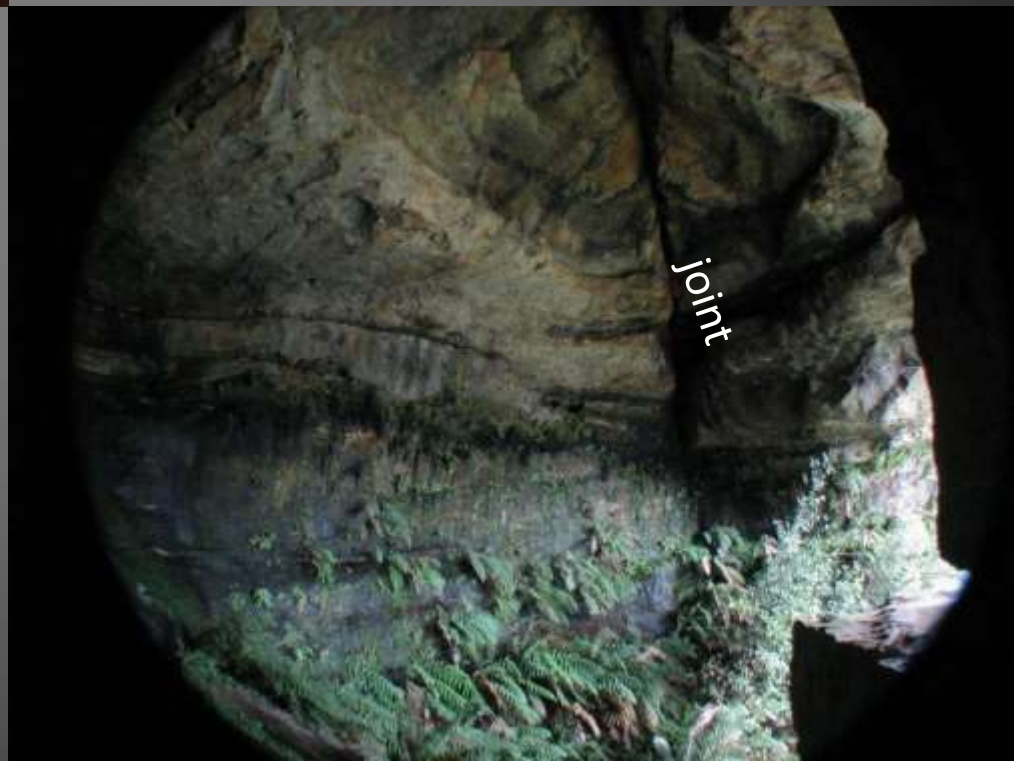
Caves initiated by vertical jointing

Differ according to whether the joint is
parallel to cliffs (when roofs are rounded)

or perpendicular to cliffs (when a triangular
cross-section is common)

Maxines Bower, Medlow Bath

Joint in roof,
Coxs Cave



Watchtower Cave,
Mt Victoria

May be a block-gliding cave,
possibly accelerated by
solutional enlargement
in vertical jointing

Speleothems

Silica speleothems, including stalactites, stalagmites (rarely) & flowstones

Greatest number in sandstone of the Grose sub-group at highest elevations of the Blue Mountains Plateau

Evidence that they are still forming & are not relict features. Common opal (SiO_2 & chalcedony

Limonite: fairly common under ledges & on cave roofs, commonest in the Hawkesbury Sandstone, the lowest formation immediately surrounding the Sydney Plain. Some in & near Glenbrook Gorge & above the Nepean River

Manganesian stalactites near Neates Glen, Blackheath, up to 10cm long

Common salt NaCl speleothems reported by BMSC from a cave near Glenbrook

So, how many caves?

- probably over 1,000 in NSW

But how to define a cave?

"Car Park No. 1 Cave", Mt Victoria