The Gambier Karst Province

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The Gambier Karst Province is an extensive area of Tertiary marine limestone and overlying Quaternary dune limestone in south-eastern South Australia and western Victoria. These are "soft rock" limestones: youthful, weakly-consolidated porous calcarenites (sandy limestones) that are quite distinct from the classical "hard rock" limestones of the east coast, and other parts of Australia.

The caves in the Quaternary dune fields are syngenetic with the initial early cementation of the limestone, but those in the Tertiary limestones postdate that cementation.

The caves in both limestones are characterized by cap rock effects, solution pipes, extensive low horizontal phreatic mazes and abundant collapse modification. They are locally well-decorated, especially with straws and moonmilk, which the ongoing collapse tends to destroy leaving many bare fractured walls.

The Tertiary limestones differ in showing good joint control on their passage orientation. Beside the gorge of the Glenelg River there are linear, stream caves. Near the coast there are extensive large flooded systems which formed during the lower sea levels of the glacial periods. Tank Cave has 6 km of flooded shallow horizontal passage and The Shaft extends to a water depth of 120m. The cenotes, large water-filled collapse dolines, are unique(?) within Australia. There are large springs rising from flooded caves at the coast and offshore.

The syngenetic caves in the dune limestone can be horizontally extensive but have little depth. The largest tend to be at the edges of the dunes - adjacent to the sea that existed when the dunes formed, and also to the later swamps. We use the term "flank margin caves" for the irregular chambers that formed where sea water mixed with fresh water at the old coast, and "swamp margin" for the later modifications by acidic swamp waters eating into the edge of the dunes. Both tend to be low-roofed horizontal crawly mazes alternating with rubble-filled domes rising towards the surface.