

HISTORY IN THE ROCKS – Mudurup Rocks and the Ice Age.

James Hutton c.1785 – “**Uniformitarianism**”. What we see around us today is the result of gradual process that have been going on for millions of years, and are still going on this very day.

eg. Bubble Sand – visible in the making today; fossilised in the limestone from before the last ice age.

Ice Ages: **Pleistocene Ice Age** (the last Glacial Epoch)
Began 2.5 million years ago, still going (interglacial now).
4 main phases (glacials) and interglacials.
Human evolution during this time (Tool-users – eg *Homo* spp).

Ice ages cause global sea-level fluctuations

Seawater locked up in ice sheets at poles and northern continents (depends on summer snow-melt).

BEFORE THE PLEISTOCENE:

There were several glacial epochs, hundreds of millions of years ago, with warm periods in between. Between the glacial epochs there were warm periods with no ice on the poles – “Greenhouse Earth”:

Sea level >200m ABOVE present level

All Swan Coastal Plain flooded – coastline at Darling Scarp.

LATE PLEISTOCENE:

200 000 years ago – sea level 50m ABOVE present level.

– followed by “bumpy” lowering of sea level – beach sand blown inland and forms dunes.

These dunes cemented by action of rain, forming limestone ridges – eg Kings Park & coastal dunes.

20 000 yrs ago (last ice maximum) – sea level 120m BELOW present – so coastline beyond Rottnest.

From 18 000 to 6 000 years ago, 3 major flooding events as sea level rose unevenly at end of ice age. (Human culture at this time – v. late Paleolithic & Mesolithic & into early Neolithic with farming & pottery) eg. “flood” at 6 000 years ago – up to 3m above present, producing exposed wave-cut platforms.

Coastal formations (process now occurring)

LOOK FOR THESE HAPPENING NOW:

Bubble-sand, wave cross-bedding, coastal dunes, erosion, wave-cut platforms, beach rock, etc.

Evidence of same processes in the past (This illustrates uniformitarianism.)

IN THE CLIFF, LOOK FOR: *Note: These are in reverse chronological order.*

- **Top 2.7m layer:** Cross-bedding in fossil sand-dune layer with fossil roots.
- **Middle layer 2.6m:** Flatter bedding layers in fossil beach sand with shells and bubble-sand.
- **Bottom layer 0.6m:** Cross-bedding in shallow marine deposits. Fine-grained with shells.

ALSO ON CLIFF: Solution-pipes and fossil roots.

Wave-cut platform high above present sea-level – evidence of higher sea-level (vis.from base of groyne).

UNDER FOOT: Beach-rock, pot-holes in old wave-cut platform, fossil roots and solution-pipes.

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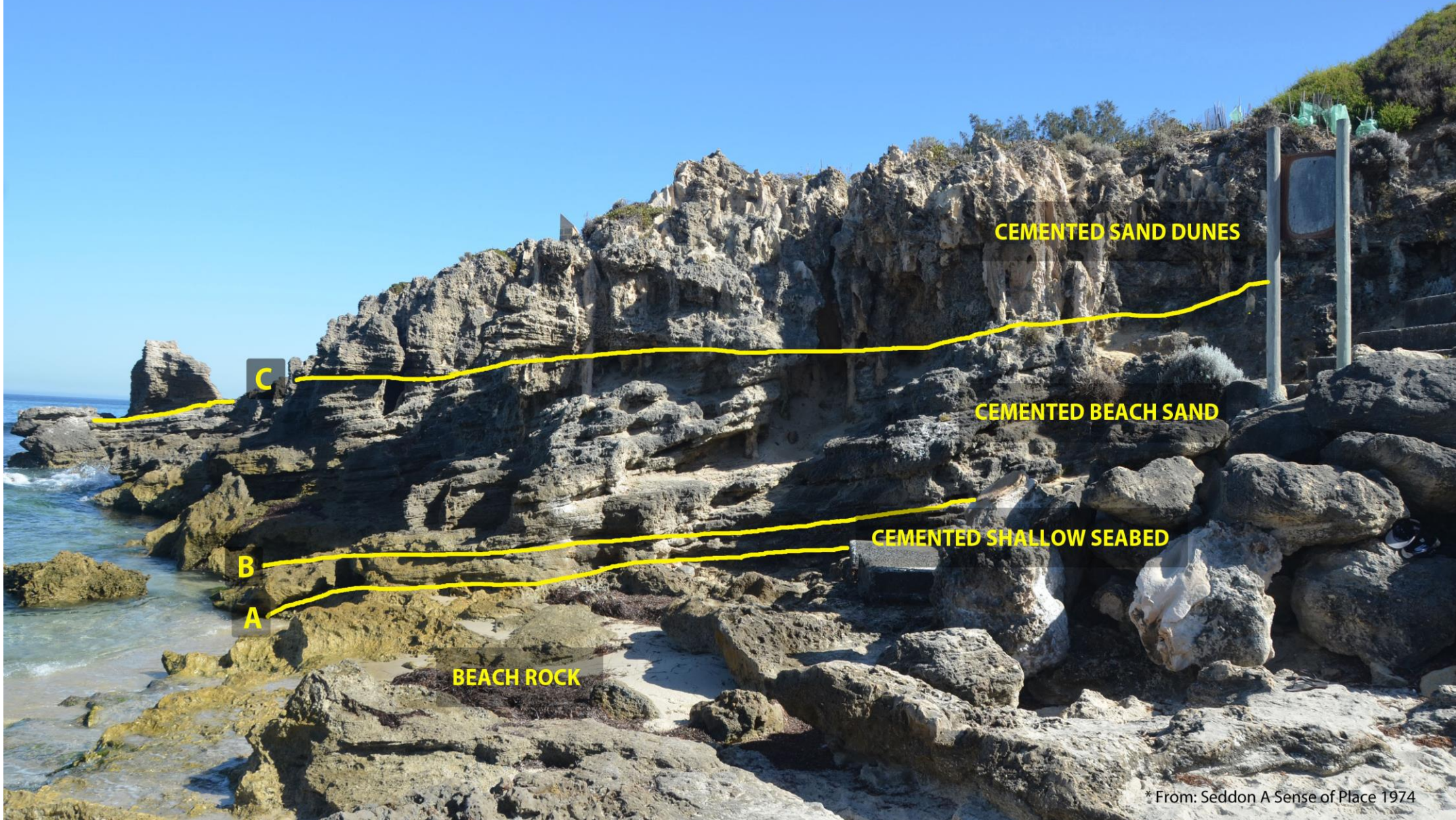
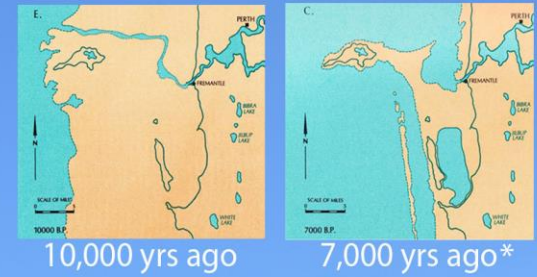
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Mike Gregson. April 2013

FOSSIL LAYERS AT MUDURUP ROCKS, COTTESLOE FORMED DURING CHANGING SEA LEVELS



* From: Seddon A Sense of Place 1974