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Coastal Erosion and Geochemistry What's Eating the Coast?

Older remnant surface in the distance.

Mangrove lined

tidal creeks.

Sediments that have accumulated on the bottom of Princess Charlotte Bay (PCB) for thousands of years were sampled at the locations marked with blue circles (43 samples).

> Terrestrial sediment samples were taken from river water, floodplains and mud flats.

> > An analysis of the geochemistry of the terrestrial and bay sediments revealed that the sediment in the bay samples were composed of;.

> > > Sand (currently unknown origin) 26.0%

Marine derived 27.6%

Coastal sediments 37.7%

Dendritic development of tidal channels furthe erodes material.

Eroded surface.

Light brown areas are remnants of the higher surface.

Tides and flood water move through the mangrove fringe carrying sediment.

Areas in yellow have high reflectance in satellite imagery and might be eroded surfaces.

> A reminder of the missing remnant surface is lone pedestals protruding from a surrounding surface of lower elevation.

The mangrove fringe losing ground.

Samples of the remnant materia were collected for OSL dating to determine when deposition of sediment last occurred on the

upper surface.

20

km

A patch work of remnant surface and eroded areas.

Dating of remnant surface indicates the coastal erosion started after ~ 500 BP. Sea level has lowered approximately 1m since the mid-Holocene (last 5 or 6 thousand years). The coastal plain has been prograding and accreting over some of that time, storing sediment as a system of coastal floodplains interspersed with chenier (sheft) ridges.

But it would appear that something has changed the sediment dynamics at the coast. The exact cause of this change is unknown at this time, but could involve;

- variation of sediment inputs to the coast (marine or terrestrial),
- changing currents in PCB,
- the perturbation of a high magnitude cyclone or cyclones (Mahina 1899?)
- variation in the strength of the monsoon over centuries,
- variation in the degree of dry season aeolian deflation of the coastal floodplain,
- salt harvesting on the coastal salt flats (known to have occured throughout part of the 1900s),
- the development of the Bizant distributary channel, etc.

These and other possible influences on the coastal sediment dynamics probably have interdependent relationships. But critical to the development of the coast and probably the erosion seen today is the lowering of sea level that occured since the mid-Holocene.



5

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More info: Prof Jon Olley, Australian Rivers Institute [j.olley@griffith.edu.au]



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