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Hosted by Dr Huang Danwei

Natural history of the Kimberley coral reefs



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The Kimberley coast is a remote and poorly studied region located in the north western continental margin of Australia. This complex landscape is characterised by a unique marine environment, considered as one of the world's greatest biodiversity hotspots, where coral reefs are particularly ubiquitous, providing abundant rocky substrate for fringing reef development. The reefs occur in sheltered and exposed settings and seemingly endure extreme environmental conditions including: (1) high turbidity and sediment input, (2) elevated water temperatures, (3) macrotidal range (up to 11 m), (4) significant subaerial exposure during low tides, and (5) frequent cyclones. Despite these extreme conditions, the coral biodiversity in the Kimberley is far richer than that of the inner Great Barrier Reef (GBR). Critically, the understanding of the development and evolution of Kimberley reefs still remains a gap in the scientific knowledge.

Here we present the first investigation of Kimberley reef geomorphology, architecture, and growth history. The project was geographically restricted to the southern Kimberley region and involved multibeam and reef habitat surveys, over 240 km of seismic lines, 54 coral reef cores and 60 radiocarbon dates.

This study achieved some remarkable, ground-breaking discoveries.

1. Kimberley reef morphology does not conform to our traditional understanding of how reefs grow; most significantly, multibeam surveyed reef flats showed elevations higher than the level of mean sea level, and required a modified geomorphic reef classification scheme to be developed for the Kimberley.
2. Seismic surveys showed that reefs are massive coral build-ups up to 15 metres thick; this is almost 3 times thicker than the geographically equivalent inshore GBR reefs.
3. Reef cores and radiocarbon dating show the initiation of reef growth occurred very soon after post-glacial marine flooding of the continental shelf some 8000 years ago, this is almost 5000 years earlier than equivalent inshore GBR reefs.

About the Speaker: *Giada Bufarale gained her MSc in Geology and subsequently joined the Applied Sedimentology, Coastal and Marine Geosciences group at Curtin University (Perth, Western Australia) as a research assistant and PhD student. Giada's research aims to answer fundamental questions of how Western Australian coast and continental shelf evolved in response to past changes in sea-level and climate and how they may change in the future. She focused on four distinct and contrasting marine environments including the Kimberley coast and offshore islands, Shark Bay, the Swan River estuary and Geopraphe Bay.*