

Te Kura Kairūri School of Surveying

Lunchtime Seminar Series



Sea-levels, seeds and lagoon island formation in the Maldives

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Lagoon islands (sand cays) form on reef platforms within the atolls of the Indian and Pacific Oceans. The general circumstances of island formation are well documented. Carbonate sand is transported by waves to a nodal depocentre; early-successional species, such as *Scaevola taccada*, establish from marine-dispersed seed, then sand accumulates around seedlings by overwash or Aeolian sedimentation. A Ghyben-Herzberg lens may develop beneath the island surface when it is no more than 1m above normal spring high tide which may, if the island remains stable, allow canopy tree species such as *Pisonia grandis* to establish. However, we know little about how plants establish on islands in equatorial environments where storm surge does not occur. Seeds may be occasionally stranded on islands during inundation by tsunami or distant-source swell waves. Such events are not uncommon, but cannot explain the ongoing establishment of plants on new islands or the margins of established islands.

The recent morphodynamics of Maaodagalaa Island, Huvadhoo Atoll, Republic of the Maldives, provided an exceptional opportunity to examine controls on plant establishment. Observations of island morphology, local sea-level, plant growth and inundation events indicate a wave event, resulting from distant source swell and/or local wind-forced waves, in combination with spring high tides, is required to strand seeds of marine-dispersed plants across the sand cay. Seedling survival is apparently related to the 7-month perigean spring high tide cycle at this location. Aeolian sedimentation and accretion around plants is required to raise the level of the island above the (next) highest perigean tides. Maintaining datums that allow the relationship between island morphology and tidal levels has proved both essential and highly frustrating.

Image: Maaodagalla Island from: Borrie, MSc: Aeolian Sedimentation on Equatorial Reef Islands, 2019

Thursday 29th Sept 2022 (12pm – 1pm)

L1 Lecture Theatre | School of Surveying, 310 Castle Street
OR Join remotely: <https://zoom.us/join> (ID: 329 427 2033, P/W: 310310)