Mangrove Response to a Rising Sea Level on an Undisturbed Atoll

RESEARCH QUESTION
How does the mangrove forest on Aldabra Atoll respond to an increasing sea level in the Indian Ocean?

RESEARCH GOALS
1. Assess change in mangrove extent over the past 35 years.
2. Generate baseline mangrove tree species diversity and structure data in relation to their environment.
3. Quantify changes in species composition in the largest mangrove stand (Bras Cinq Cases) over the past 60 years.

BACKGROUND INFORMATION
Low-lying islands and endemic biodiversity are challenged by habitat loss because of sea level rise. Around Aldabra, an atoll in the Indian Ocean, sea level has increased over the past decade at a rate exceeding the global average [1]. This could lead to an increase in inundation and salinity experienced by mangrove species lining the lagoon of the atoll. The assessment of the long-term stability of this undisturbed habitat is critical for the diverse range of fauna that depends on it.

Expected mangrove response to a rising sea level on Aldabra.

METHODS AND DATA
1. Mangrove extent

2. Mangrove species diversity and structure
   - Upcoming campaign 20Q19: record species distribution, structure, seedling regeneration, abiotic variables (inundation period, soil salinity and elemental concentrations) in 72 plots of 5 x 5 m across two islands.

3. Species composition
   - Classification of drone imagery from 2015 over Bras Cinq Cases and comparison with species map from expedition in 1967 [3].

PRELIMINARY RESULTS
1. Mangrove extent
   - Net gain of 174 ha in mangrove area from 1995 to 2019 (total mangrove area 1720 ha).
   - Stands are dynamic, especially at their landward margins.
   - Considerable retraction in mature mangrove stands on exposed coasts means an increased probability of loss in functional diversity.

2. Mangrove species diversity and structure
   - Rhizophora mucronata is structurally dominant, followed by Ceriops tagal and Avicennia marina (on average taller and larger).

3. Species composition
   - Rhizophora mucronata replaced Avicennia marina as the dominant species at Bras Cinq Cases. Mangrove species evenness is decreasing.

REFERENCES

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