Records of coastal change within a progradational, wave-dominated barrier island: morphotectonic framework of the southern recurved spit of Assateague Island, VA

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1. Motivation

- Barrier islands: Generally retrogradational, but commonly progradational elements (see Fig. 1).
- Utility of barrier island/spit progradational elements to record coastal change:
  1. Surface morphology: former shoreline positions of barrier island recorded as crests of beach/dune ridges.
  2. Subsurface architecture: spit growth/shoreface geometries preserved in wave-dominated systems. Progradation potential to record sediment supply (e.g., Proxmier et al., 2015, JGR; Carlutia et al., 2017, AGU Abstract).
- Potential to record storms and sea-level change (e.g., Costas and FitzGerald, 2011, Mar. Geol.; Rink and Lopez, 2011, Geol.; Hede et al., 2013, The Holocene).

2. Background and Study Area

Styles of Coastal Progradation

Virginia Barrier Islands

Shore-Parallel Architecture

3. Stratigraphic Architecture and Geomorphology

- Model of Spit Growth

4. Discussion

Coastal Evolution

Assateague Island: Complete pattern associated with downstrad progradation:
  1. Channel fill & spit platform
  2. Secondary branching & infill
  3. Inland migration
  4. Continued elongation and formation of barrier elements
  5. Assateague Island: Widened through beach-shoreface growth. Non-aeolian progradation (see Fig. 5) and short, narrow beach and dune ridges: suggest rapid progradation in a semi-enclosed environment with variable sediment supply.

Wallops Island: Despite similar progradational processes as Chincoteague Island (semi-protected, widened through wave-influenced and berm formation), have very different resulting ridge morphology (taller, closer ridges)

5. Acknowledgments

We thank J. Connell for assistance with data analysis and field work. Additional field assistance was provided by D. Costas and L. Karar. We are grateful for sampling and field support from the Towns of Chincoteague, Assateague Island also identified. Later breach, interpreted to be associated with a breach at Cherry Tree Hill inlet, ~2 km south of Assateague Island.

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