Uplift of the Florida Peninsula, Reversal of the St. Johns River, and the Origin of Cape Canaveral

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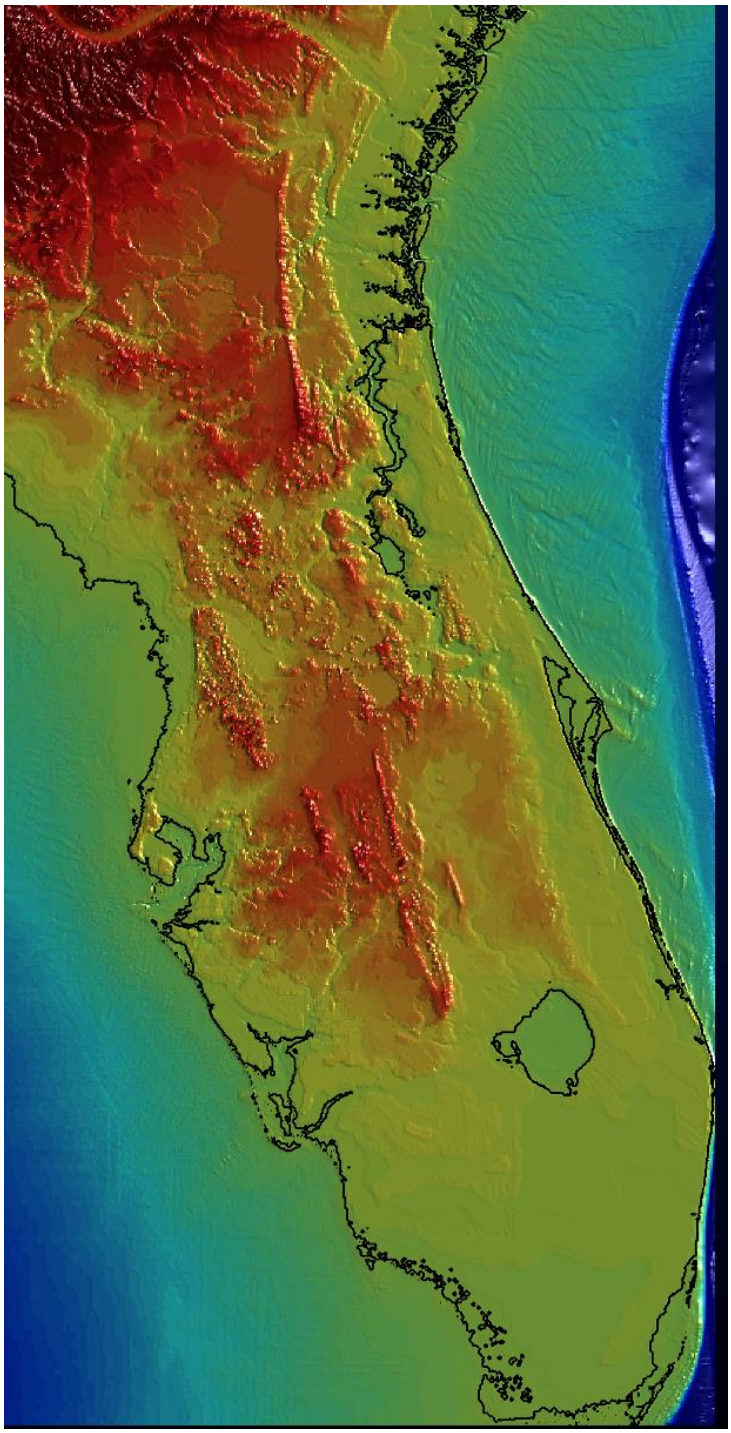
Enigmatic sedimentary ridges of coastal and shallow marine origin that decorate the central Florida peninsula have paleontological assemblages that indicate a Quaternary-aged depositional origin, but occupy elevations significantly higher than any Quaternary sea level high stands. In this presentation, I address this conundrum through a simple numerical model that simulates isostatic uplift of the Florida peninsula in response to crustal mass loss by dissolution of carbonate rock. The model successfully simulates the elevations of 4 prominent ridges that span the length of the peninsula and offers ages for these ridges that coincide with 1.44 ma, 1.35 ma, 408 ka, and 120 ka highstands. Extending the model to account for a flexural isostatic response to the observed, non-uniform carbonate dissolution pattern visible in Florida's karst topography, suggests that the northern portion of the peninsula has been tilting down-to-the-north, which matches the along-strike ridge profiles. By considering previously published optically stimulated luminescence ages, tracking the slightly incised course of the St. Johns River, and reconstructing beach ridge patterns for Cape Canaveral and Merritt Island, a hypothesis is proposed that the St. Johns River has experienced flow reversal within the last 80 ka, causing abandonment of a paleodelta, which remains today as the Merritt Island-Cape Canaveral sedimentary complex, currently being reshaped by southward directed longshore sediment transport.



Friday, January 31 @ 3 PM
EOAS 1044