

Sedimentological Characteristics and Internal Architecture of Two Overwash Fans from Hurricanes Ivan, Frances and Jeanne

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Abstract

Detailed 3D sedimentological characteristics of two recent overwash fans were studied through intensive coring, trenching and imaging using ground penetration radar (GPR). Extensive overwash along Florida coast resulting from the passages of four strong hurricanes during August and September, 2004 provided an excellent opportunity to study the spatial patterns and sedimentary architecture of overwash deposits. Overwash fans located on Hutchinson Island, Florida - an Atlantic facing barrier (Hurricanes Frances and Jeanne), and Santa Rosa Island, Florida - a northern Gulf facing barrier (Hurricane Ivan) were examined in this study. Subsurface imaging using a 250 MHz GPR system correlated well with bedding features and bounding surfaces observed in the cores and trenches. Prominent, concordant horizontal to sub-horizontal reflections correspond with the basal contact of the overwash deposits. Stratification in the overlying sediment is dominantly horizontal to gently landward sloping ($<5^\circ$), mimicking the surface morphology, and merges landward into steeply dipping (5 to 25°) reflectors and tabular forsets. Discordant reflective patterns locally interrupt the largely planar fabric, and appear to represent remnants of truncated dunes, and in places scour holes. The internal architecture of the overwash lobes is characterized by: (1) concordant horizontal to sub-horizontal stratification resulting from high flow regime overwash along a subaerial wetted surface and (2) steeply dipping landward, tabular forsets, resulting from landward progradation and subaqueous deposition, likely into a washover pond or flooded lagoon.