Two areas of the west Florida shelf seafloor were studied in order to understand the spatial and temporal variations in sedimentary cover, the relationship between sedimentary properties and remotely sensed data, and the relationships of data of different spatial and temporal scales. Analyses of side-scan sonar imagery, sediment samples, and box cores reveal spatial differences in the size, shape, spacing, surficial grain size distribution, and sub-surface sedimentary structures of sand ridges found at 5-8 m water depth compared to sand lenses at 15-18 m water depth. Northwest-southeast trending sand ridges in the nearshore area are an order of magnitude smaller in spatial extent than those in the midshelf. Side-scan backscatter reflects the heterogeneity of the nearshore surface sediments and the homogeneity of the midshelf sediments. Box core peels reveal these surficial sedimentary properties extend to a depth of 25 cm.

Time series of side-scan images reveal significant but inconsistent movement of sediments along the sharp borders between coarse trough sediments and fine sand features. The overall size and shape of the first-order sedimentary features in both areas change little over annual temporal scales. Significant movement was also not evident during a one week experiment related to the passage of a storm front. Mean bottom current velocities were not sufficient to initiate sediment movement, indicating that other hydrologic forcing mechanisms are responsible for the sedimentary movement observed. Shallow sub-surface sedimentary structures in the nearshore area indicate past sedimentary transport events related to wave forcing and combined flow.

The results of this study show that sediment distribution and seabed morphology vary spatially over scales of 10's of kilometers, but do not vary temporally over event-related or annual time scales. Hydrologic forcing mechanisms measured here do not account for the patterns of sedimentary morphology observed. Backscatter correlates strongly with grain size and carbonate content; however, modeling the relationship between

side-scan backscatter and sedimentary properties using multiple regression analysis was not effective. Other sedimentary and environmental factors, such as roughness and water column properties, significantly influence the side-scan backscatter intensity.

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