

ABSTRACT

Onslow Bay is a high-energy, sediment-starved shelf characterized by extensive areas of exposed hardgrounds varying in lithology and relief. These hardgrounds have been shown to be of economic importance due to the productive marine habitats they support; however, annual variations in the thickness and distribution of sands on hardbottom surfaces have been shown to profoundly affect these ecological communities. The present study compares mid-shelf sediment dynamics around a productive marine hardbottom with vertical relief of ~1 m to a nearby area characterized by a broad flat bottom and consisting mainly of fine to coarse grained surficial sands. The effects of reef geometry on sediment transport processes around this hardbottom area are examined using two long-term data sets containing current velocity profiles from the sea surface to the seabed, acoustic backscatter profiles, and seabed elevation data at the two sites. Current velocity profiles measured above and below the elevation of the reef ledge were compared at both sites during sediment transport events that exhibited similar current magnitude and direction in order to elucidate any effects that the hardbottom reef may exert on the hydrodynamics. In addition, shear velocities were calculated using a 1-D bottom boundary layer model. These analyses indicate that the hardbottom reef does affect the hydrodynamics and sediment transport processes within the bottom boundary layer at the site closest to the hardbottom ledge, particularly when the currents are from the north and passing over the hardbottom surface.