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**High frequency scattering from discrete inclusions in marine sediments**

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A model of high frequency scattering from sediments with discrete inclusions (such as shells and shell fragments) having an arbitrary size-depth distribution is developed. The model assumes also knowledge of a depth-dependent individual scattering function of inclusions. It is more general than in previous models and includes discrete scatterers located both below and on the water-sediment interface (partially buried). Some simple results are obtained for the case of high enough frequencies using approaches of geometry acoustics. Frequency-angular dependencies of the bottom backscattering strength are calculated for sediments with different size-depth distributions of inclusions. Inputs for the size distribution of inclusions (shell fragments) are obtained from granulometric analysis of coarse fractions of the sediment samples taken at the SAX99/SAX04 site (near Ft Walton Beach, Florida). It is shown that taking into account partially buried shells is important and can significantly enhance estimates of the bottom scattering strength especially at grazing angles below critical (about 30 degrees for sand). [Work supported by ONR, Ocean Acoustics].