The chirp sonar is a quantitative subbottom profiler that can generate wide dynamic range, artifact-free seismograms in real time. These high quality seismograms, can be used for quantitative analyses, such as reflectivity and attenuation measurements, and sediment classification. Key features of the chirp sonar include (1) a computer-generated FM pilot signal with a large time-bandwidth product that contains amplitude and phase compensation providing exact control of the transmitted acoustic pulse (2) directional arrays with low backlobe levels and (3) a towed vehicle designed to scatter bottom multiples. Subbottom profiles, acquired in Narragansett Bay, R.I., demonstrated 20 cm vertical resolution, 62 meter subbottom penetration and significant bottom multiple reduction.^ A new time domain technique for estimating acoustic attenuation, called the autocorrelation method, is described and compared to well known attenuation measurement techniques. The spectral ratio method is most accurate, followed by the autocorrelation and wavelet matching methods for estimating the acoustic attenuation coefficient of sediments from reflection profiles. However, the autocorrelation method is the only technique efficient enough to provide an attenuation measurement for every depth increment in each acoustic return in real time. Multiple reflections, gradual impedance changes and windowing sidelobes degrade the attenuation estimates. Chirp sonar remote measurements off Hope Island were used to estimate the attenuation coefficient for clayey silts (0.091 dB/m/kHz by spectral ratio and 0.125 dB/m/kHz by autocorrelation), values which agree with in situ measurements made by Hamilton, but are significantly higher than the attenuation coefficient (0.019 dB/m/kHz, n = 1.50) calculated from laboratory measurements (250-750 kHz) on a core from the Hope Island site. More ground truth measurements are required to establish the accuracy of remote attenuation measurements using the chirp sonar