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**Estimating sediment speed and attenuation with sub-bottom reflections**

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An inversion method based on sub-bottom reflection is investigated using LFM data collected by a Vertical Linear Array from the SW06 experiment. The distance between the LFM source and the array is about 230m. After extracting the impulse response with matched filter from the received signal, the sub-bottom reflections were found to be strong. The chirp sonar survey nearby the experiment site showed that there is a prominent shallow sub-bottom R reflector with about 20 m depth (based on 1500 m/s). The relative arrival time and amplitude of the sub-bottom reflection signals were used to estimate the sound speed and the attenuation of the sediment. Because the direct arrivals in the water were influenced strongly by the internal wave, the first bottom reflection was applied as the reference path to calculate the relative arrival time and absorption loss in sediment. The sediment attenuation was estimated by assuming that it had linear frequency dependence. The estimated values of the sediment sound speed and attenuation were compared with matched field geoaoustic inversion results published by other research group.