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**Measuring attenuation and velocity within unconsolidated
lacustrine sediments, using high-resolution seismic data**

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We present estimates of in-situ compressional-wave attenuation and velocity within the uppermost 30 m of unconsolidated lacustrine sediments within Lake Windermere (U.K.), using high-resolution seismic data acquired with Boomer and Chirp sources. The wide frequency bandwidth of the Chirp source allows attenuation to be examined over a frequency range of approximately 2-9 kHz, and by using a spectral ratio technique incorporating robust re-weighted least squares regression, the apparent quality factor of sediments can be accurately and precisely determined. A 60 m multi-channel streamer used with the Boomer source allows interval velocities between target reflectors to be obtained. Models relating quality factor to mean grain-size distinguish between coarse grain-dominated and clay-dominated sediments. The interval velocities improve the classification of the sediment sequences to clays, laminated silts & sands, and coarse sand and gravel deposits. The results are evaluated against geological and core data.