

Internal wave parameters inferred from ADCP records

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A method for extracting internal wave characteristics from time series of current velocity profiles, measured by moored acoustic Doppler current profilers (ADCPS) is described. The method is applied to 40-day time series acquired at the shelf edge off the coast of New Jersey. Horizontal and vertical velocity components at each depth level are band pass filtered to isolate high-frequency internal waves (periods between 2 h and 12 min). Filtered data are decomposed into depth-time empirical orthogonal function (EOF) modes which compare quite favorably with dynamical internal wave modes based on local buoyancy frequency profiles. Vertical displacement is derived by temporally integrating vertical velocity. Modal flux series, formed by the product of displacement and horizontal velocity, are analyzed to determine amplitude and direction of internal wave packets. Results compare favorably with concurrent moored thermistor chain and CTD measurements. The generation of a synthetic time-dependent profile of sound speed, based on ADCP vertical displacement series, is presented.