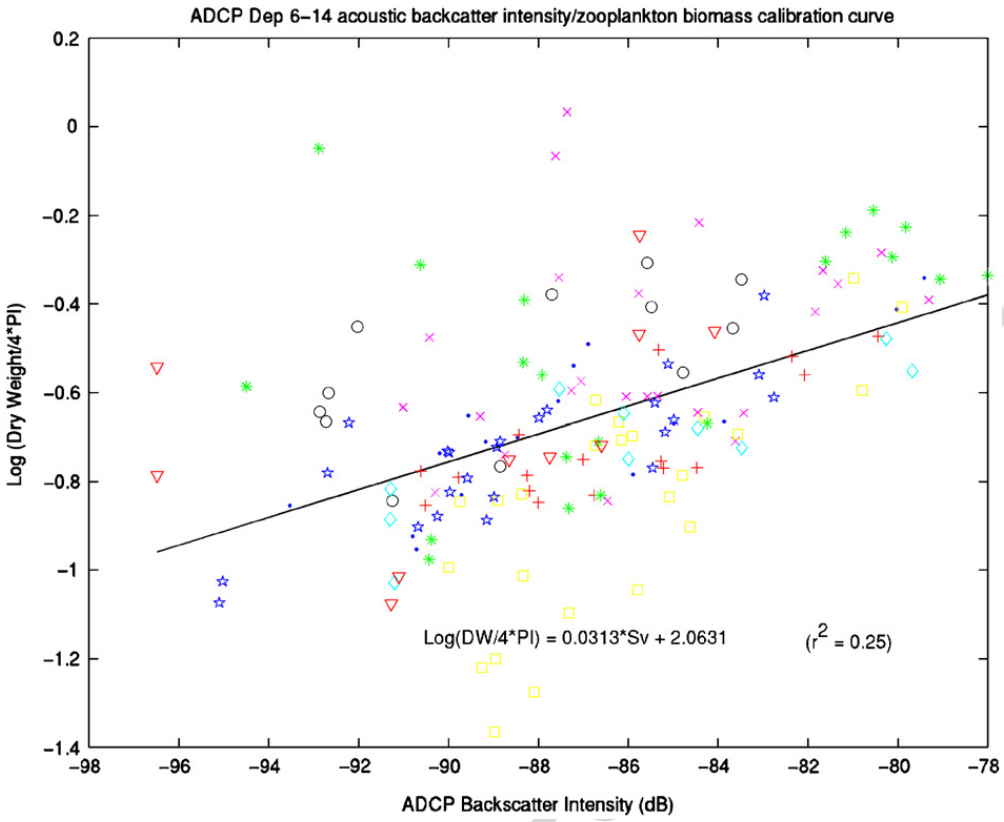

Fig. 1. ADCP acoustic backscatter intensity/zooplankton biomass calibration curve. The linear regression line using composite data from all deployments is shown. This relationship was used as a calibration to estimate zooplankton biomass. Different symbols represent different deployments (Table 2).

itself. If vertical water velocities are small, the vertical velocity measured by the ADCP can be interpreted as the vertical swimming velocity of the scattering organisms (Heywood, 1996; Luo et al., 2000). Because of surface waves, the mooring buoy moves vertically, and the vertical velocity measured by the ADCP is not truly an absolute velocity of scattering organisms. To ascertain migration velocity, we define one bin (or in some cases the averages of several bins) near the surface for reference and then subtract its value from each bin in the same profile (Luo et al., 2000). This approach minimizes biases introduced by vertical buoy motions.

2.5. Statistical methods

The ADCPs depth varied somewhat for different deployments (Table 1), and the top bin used for the analyses (i.e., cut off bin) also varied with sea state. For consistency, depth bins for zooplankton biomass and backscatter intensity as recorded by the ADCP were interpolated to enable statistical analyses of data for depths between 22 and 190 m. Spectra were computed for current speeds and zooplankton biomass using 1024-point fast Fourier transforms (FFTs) tapered with a Hanning window, zero overlap. The 95% confidence intervals were calculated for the spectra. In order to calculate cross-correlations between zooplankton biomass, chl-*a*, and temperature, daily averages were computed using the high-resolution time series data and then a high-pass filter (30 days) was applied to remove low-frequency variability (61 days of data were used for each computation). Cross-correlations were then computed to investigate relationships between zooplankton biomass and environmental parameters.

3. Results

The results of our analyses are subdivided in order to focus on some of the more important processes and their respective scales as follows: seasonal cycles and spring blooms, mesoscale eddies, wind events, and variability in diel vertical migration.