Horizontal currents at 40-m depth are displayed in Figure 5 to provide an overview of the current structure of Cyclone Noah. The current magnitudes increase roughly linearly as a function of distance from the eddy center before starting to decrease at distances of roughly 40 to 60 km from the eddy center. Maximum tangential current velocities reached about 60 cm sec^{-1}.

Drifter trajectories obtained within Noah are displayed in Figure 6 and clearly show the cyclonic motion of the feature and suggest its ellipticity. It appears that the OPL surface drifter made two revolutions around the eddy's center. These data were useful in estimating the eddy center and approximate tangential velocities. A METOCEAN bio-optical drifter and a drifting sediment trap array both followed trajectories that were consistent with that of the OPL surface drifter.

Elliptically shaped eddies, such as Cyclone Noah, have been noted in other historical data sets collected in the region (e.g., Patzert, 1969; Lumpkin, 1998; Seki et al., 2001, 2003; Bidigare et al., 2003). Complementary ADCP and drifter data (Figures 5 and 6) and additional remote sensing SST images are not as definitive, but are supportive of this assertion. A clear doming of the σ_{23} contour in the eddy's center, which is congruent with enhanced chlorophyll *a* concentrations, implies that Cyclone Noah, although likely in a relaxed or spin-down phase, was productive due to nutrient enrichment from subsurface waters (see nutrient transect section in Figure 4). Interestingly, however, two days of strong trade winds (over 35 knots causing cessation of CTD operations; see Figure 1) may have acted to re-energize Noah for a brief spell as indicated by possible shoaling of the σ_{23} isopycnal surface at Noah's center. Satellite SST imagery during the cruise also indicated that the eddy had relaxed and then re-energized over the study period.

E-Flux II

The E-Flux II field experiment, conducted from January 10 to 28, 2005 (YD 10-28), followed E-Flux I, which ended on November 22, 2004. The wind time series shown in Figure 1 indicates generally weak winds with variable directions from late December 2004 through the time period encompassing the E-Flux II cruise period. The key point here is that northeasterly trade winds were especially rare during E-Flux II; at times southwesterly winds prevailed (180^0 with respect to the northeasterly trade wind direction). QuikScat wind vectors and speeds shown in Figure 7a are representative for E-Flux II. Thus, wind-forcing conditions were clearly unfavorable for the generation of mesoscale eddies. Furthermore, satellite SST images did not indicate the presence of any eddies with surface expressions in the region from mid-December 2004 until early February 2005 (Figure 7b). Interestingly, warm waters appeared in satellite SST images (i.e., Figure 7b) to the southwest of the 'Alenuihaha Channel where cold eddies are often spawned.

With no obvious hints of mesoscale features in the study region prior to the E-Flux II cruise, it was decided to first begin mapping surface currents (ADCP data) and subsurface hydrographic and bio-optical variables along selected sections to attempt to discover any sub-mesoscale and/or mesoscale features that might be present and outside the detection limits of remote sensors. Data were plotted in near real-time for inspection. A map indicating the sampling transects for E-Flux II is shown in Figure 8 and Table 2 shows the start and end times of each of the transects. The first mapping section, Transect 1, was nearly coincident with the transect that passed through the center of the mature eddy (Eddy Noah) studied in detail during E-Flux I. Transect 1 began on January 10 at 20.3^{0}N, 156.5^{0}W and extended southward along 156.5^{0}W to 18.7^{0}N. The spacing