times of eddy formation and dissipation are only approximations. The E-Flux III *R/V Wecoma* cruise, conducted from March 10 to 28, 2005 (YD 69-87), thus likely occurred during the mature phase of the eddy.

Unlike Cyclone Noah, Cyclone Opal moved quite rapidly southward by about 160 km (~88 nmi) from the beginning to the end of the experiment with an overall average displacement speed being about 0.33 km h^{-1} (9.2 cm sec^{-1} or 0.17 knots). The transit velocity of the eddy center varied considerably during the course of the experiment, at times being quite small while moving quite rapidly during others. For example, we estimate that during the period of March 11 and 12, when winds reached over 20 m/sec (~35 knots), Opal moved southward at roughly 44 cm sec^{-1} (slightly less than about 55 cm sec^{-1} or 1 knot). This fast movement and the small scale (~30 km or less in diameter) of the eddy's inner-core region of extremely high biomass, productivity, and particle flux presented a major sampling challenge. The planned shipboard transect pattern (see Figure 12a) was necessarily modified during the cruise in order to have all of the transects passing through the center of the eddy. The data were then plotted and interpreted with respect to the moving center of the eddy in a quasi-Lagrangian reference frame. A depiction of Opal's movement in time and its approximate horizontal extent are illustrated in Figure 12b. The actual sampling pattern for E-Flux III is shown in Figure 12c. As already mentioned, careful monitoring of the underway ADCP data (using currents at depth of about 40 m) was especially critical for tracking the center of Opal and planning of transects. ADCP current transects were also used to estimate the diameter of the eddy, that was found to be about 180-200 km; thus Cyclone Opal's areal extent was much greater than that of the Big Island (Figure 12b).

Information concerning individual transects and stations within the eddy (In Stations) and outside the eddy (Out Stations) is summarized in Table 3. CTD/rosette sampling was done from near the surface to depths of 500, 1000, or 3000 m; Transect 3 was the most intensely sampled transect (the so called money run. The optics package was also deployed during some of the casts; however these data are beyond the scope of this paper. The nominal spacing between stations was again about 16 km (10 nmi). Vertical transects of temperature, nitrate+nitrite concentrations, and chlorophyll *a* concentrations collected during Transect 3 of E-Flux III are shown in Figure 13. We attempted to sample each section as rapidly as possible because of synopticity considerations and movement of the feature, but some error has been unavoidably introduced. From the density structure it was possible to obtain a second estimate of the dimension of the eddy. The radial extent of the eddy was estimated to be at locations where isopycnal surfaces became nearly horizontal (i.e., σ_{24} slopes near zero), therefore we conservatively estimate the diameter of Opal to be 180-200 km. These values are in good agreement with the ones obtained from the 40 m ADCP data.

The most important information evident in the Transect 3 section data is reflected in the doming of isotherms, isopycnal surfaces, and isopleths of nitrate+nitrite and chlorophyll *a* in the center of the eddy. The doming shows the classic structure of a cold-core eddy (Figure 13). For example, isotherms at a depth of 150 m outside the eddy are uplifted in the center by about 70 m with some isotherms within the eddy apparently outcropping to the surface. Outcropping of isopycnals (σ_t = 23.2, 23.4, and 23.6 kg m^{-3}) at the surface suggests that the eddy was intense and likely in a well-developed segment of its lifetime. Similar, uplifting of the 35 psu isohaline surface near the eddy's center and outcropping of isohalines are evident in the data sets as well