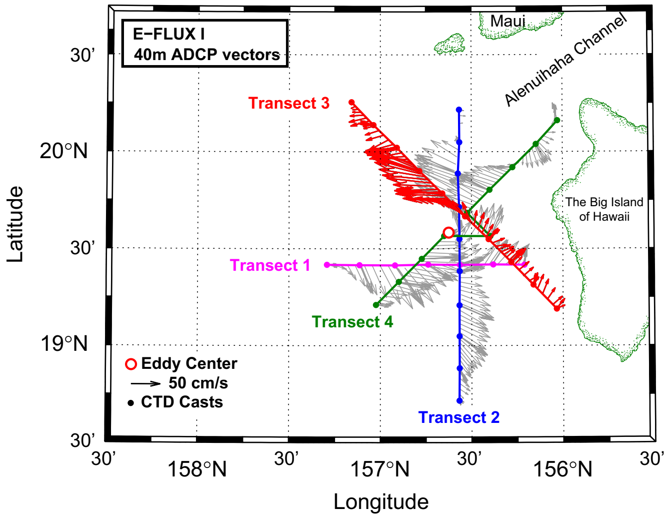

Fig. 5. ADCP current vectors in the upper layer (40 m) during E-Flux I. For every transect the position of the center of the eddy has been determined. The transects have been positioned with respect to the center of Transect 3.

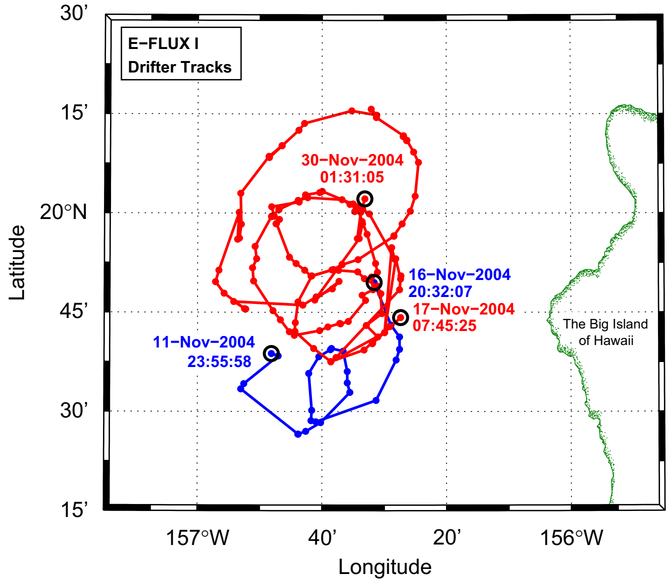

Fig. 6. Drifter trajectories during E-Flux I.

A subsurface inner-core of high-salinity water was centered at a depth of about 80 m in the region of the eddy's center (note: salinity data are displayed in Kuwahara et al., 2008). A central chlorophyll *a* maximum peak (concentrations greater than 0.5 mg m^{-3}) was located at a depth of roughly 75–80 m and its horizontal position was virtually co-located with the geometric center of the eddy. The chlorophyll *a* maximum layer deepened away from the center of the eddy and chlorophyll *a* concentration decreased radially. The chlorophyll *a* maximum layer was loosely bounded by isopycnal surfaces of 24–23.5 kg m^{-3}, and there was a good correspondence between chlorophyll *a* and particulate maxima (not shown here). The inner-core region of slightly higher chlorophyll *a* was apparently less than 15 km in diameter. The 1% light level depth is also indicated in the chlorophyll *a* panel of Fig. 4. The uplifting of nutrients into the euphotic layer and the increased chlorophyll *a* levels toward the center of the eddy are consistent with enhanced nutrient stimulated productivity within cold-core eddies. The overall extent of the eddy shows strong anomalies reflected in lower temperature, higher salinity, greater density, higher nitrate + nitrite concentrations, and higher chlorophyll *a* concentrations (Kuwahara et al., 2008; Rii et al., 2008).

Horizontal currents at 40-m depth are displayed in Fig. 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 40–60 km from the eddy center. Maximum tangential current velocities reached about 60 cm s^{-1}. Drifter trajectories obtained within *Noah* are displayed in Fig. 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. Previous research on Hawaiian lee eddies by Lumpkin (1998) has indicated that statistically, cyclonic eddies typically translate westward at near the wave speed of a first baroclinic Rossby wave and generally to drift toward the north tending to cause separation from southward drifting anti-cyclonic eddies. Theoretical considerations invoking the β-effect also support westward eddy movement (Cushman-Roisin et al., 1990; Chassignet and Cushman-Roisin, 1991) and eddy–eddy interactions can lead to westward movement as well (Lumpkin, 1998). Interestingly, Cyclone *Noah* did not appear to translate over a significant distance after its formation nor during or after our experiment based on satellite SST and ship-based measurements.

Elliptically shaped eddies, such as Cyclone *Noah*, have been noted in other historical data sets collected in the region (Patzert, 1969; Lumpkin, 1998; Seki et al., 2001, 2002; Bidigare et al., 2003). Complementary ADCP and drifter data (Figs. 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–t_{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 Fig. 4). Interestingly, however, two days of strong trade winds (over 35 knots causing cessation of CTD operations; see Fig. 1) may have acted to re-energize *Noah* for a brief spell as indicated by possible shoaling of the σ–t_{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.