



Fig. 3. Mean (bold lines) and standard deviation (thin lines) depth profiles to 500 m depth of temperature ($^{\circ}\text{C}$), salinity (psu), density (kg m^{-3}) and bio-optically derived chlorophyll *a* fluorescence (mg m^{-3}) from IN_{AVG} (blue) and OUT_{AVG} (red) stations. Mixed-layer depths were derived from the depth at which temperature decreased by 1°C from 10 m depth and found at 40 and 89 m, respectively.

depths (>250 m) where temperatures are $<20^{\circ}\text{C}$. As expected for wind-generated surface features, there is apparently no entrainment of the relatively deeper NPIW within the eddy. Thus, the water mass of Hawaiian lee eddies consists mainly of STSW waters that are uplifted into the surface. Although temperature is the most significant parameter in controlling the interior density of *Noah*, the *T-S* diagram shows that salinity also plays a major role near the surface where uplifting of isopycnal layers is pronounced.

3.2. Biogeochemical properties

Concentrations of chlorophyll *a*, oxygen and inorganic macronutrients (NO_2+NO_3 , PO_4 and $\text{Si}(\text{OH})_4$) from representative Transects 2 and 3 are shown in Figs. 5 and 6 (also see Rii et al., 2008). The DPA's are shown in these same figures. The contours

superimposed on the DPA sections are isolines of density anomaly. Bio-optically derived fluorometric chlorophyll *a* data were calibrated using a regression curve determined by using total chlorophyll *a* concentrations measured from water samples (Benitez-Nelson et al., 2008). One percent light level depths were computed based on the empirical relationship between vertically integrated chlorophyll *a* concentrations and sub-surface downwelling irradiance (Morel, 1988; Dickey et al., 2008; Nencioli et al., 2008). Chlorophyll *a* measurements show enhanced concentrations roughly following the $\sigma_t = 24 \text{ kg m}^{-3}$ isopycnal, which domes toward the center for both transects (Fig. 5A). One percent light level depths across both transects are found at ~ 118 m and do not show any significant light attenuation effects from increased chlorophyll *a* concentrations. Although subsurface maximum concentrations of chlorophyll *a*, dissolved oxygen, and nutrients were relatively higher near the center of Cyclone *Noah*, the horizontal displacements were not as prominent as observed