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Little work has been done to estimate turbulence characteristics in the hypolimnetic waters of large lakes, where the magnitude and vertical structure of turbulent parameters have important implications for nutrient cycling and benthic exchange. In this thesis, hypolimnetic mixing is investigated over the annual stratification cycle in a large lake using a series of experiments in Lake Michigan that utilize acoustic Doppler velocimeters, thermistors, and microstructure profilers to characterize mean flow and turbulence throughout the water column. More than 500 days of physical limnological data were collected and analyzed over the course of this study, creating the most comprehensive data set of its kind in the Laurentian Great Lakes. While we found that bottom boundary layer turbulence and mean flow follow law-of-the-wall predictions in the mean, individual estimates were shown to deviate significantly from canonical expectations, with deviations linked to weakly energetic flow conditions (i.e. low speeds) and seiche-scale flow unsteadiness. Bottom boundary layer characteristics, including the mean current speed (U_{50}=3 cm/s), drag coefficient ($C_{d\ 50}$=0.0052), and turbulent kinetic energy dissipation ($\epsilon_{50}=10^{-8}$ W/kg), showed very little seasonal variation, despite highly variable surface forcing (e.g. stratification, wind speeds). Full water column turbulence profiles measured during the stratified summer were largely buoyancy suppressed, with internal Poincaré waves driving enhanced turbulent kinetic energy dissipation ($\epsilon=10^{-7}$ m^2/s^3) in the relatively compact thermocline and weak hypolimnetic mixing ($K_z=10^{-6}m^2/s$) limiting benthic nutrient delivery. Although small temperature gradients drove strong mixing over the isothermal period ($K_z=10^{-3}m^2/s$), velocity shear was overwhelmed by weakly stable stratification (Ri≈0.2), limiting the development of the surface mixed layer and suppressing hypolimnetic turbulence ($\epsilon=10^{-9}$ W/kg; $K_z=10^{-4}m^2/s$). When surface temperatures fell below the temperature of maximum density ($T_{MD}\approx$ 4℃), radiative convection played a major role in driving vertical transport, with energetic full water column mixing throughout the day followed by surface cooling and restratification overnight. During this "convective winter" period, daily temperature instabilities were directly correlated with elevated turbulence levels ($\epsilon=10^{-7}$ W/kg; $K_z\approx10^{-1}m^2/s$), and overnight turbulence characteristics were similar to those observed over the isothermal spring. Near surface dissipation (ϵ) and diffusivity (K_z) measurements followed similarity scaling arguments, with wind shear and surface fluxes dominating production in the surface mixed layer during all three seasons. Together, these results are used to model the influence of invasive dreissenids over each forcing period, providing insight into the annual variability of effective filtration rates in the calm, hypolimnetic waters of Lake Michigan.