Abstract View

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Inertial Current in Lake Ontario, Winter 1972–73 (IFYGL)

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ABSTRACT

Nearly four months of continuous current and temperature data, taking during the 1972–73 winter depths of about 15 and 75 m in Lake Ontario, have been analyzed for evidence of inertial oscillations. The data, collected as part of the International Field Year for the Great Lakes (IFYGL), were obtained at nine stations: one near midlake, about 40 km from shore, and in about 140 m of water; the other eight spaced around the lake, about 50 km apart, 12 km from shore and in 100 m of water. Inertial currents occurred in episodes lasting less than 5 days and had speeds less than 15 cm s^{-1}. At the midlake and easternmost stations, the inertial currents accounted for as much as 10% (on average) of the total current variance. Some inertial events in midlake had no counterpart nearer shore. In contrast, a lakewide episode of inertial currents was induced by a storm during a two to three week period of vertical stratification. The average hodographs during the stratified period, calculated from bandpassed shallow currents, were ellipses with major axes oriented generally alongshore and axis ratios of 1.05 to 1.64. Some of the data can be interpreted in terms of internal-inertial waves with downward energy propagation and a vertical wavelength equal to the basin depth. Observed shifts to frequencies higher and lower than the inertial value were most likely caused by an interaction with lower frequency current (Doppler effects).