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The Thermal Current in Lake Michigan

Joseph Chi Kan Huang

Scripps Institution of Oceanography, La Jolla, Calif

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ABSTRACT

A theoretical and observational study is made of the thermally induced circulation in Lake Michigan. The temperature and the velocity field are obtained by solving the coupled equations of motion and the energy equation using a regular perturbation together with the method of matched asymptotic expansion. Different horizontal and vertical eddy diffusion coefficients are used.

Two types of circulation patterns are found. The type A circulation is dominated by a cyclonic meridional flow with upwelling at the edges, while that of type **B** is anticyclonic with upwelling in the middle.

Comparisons between the theoretical results and the previously published and presently observed data show very good qualitative, and to some extent, quantitative agreement for the corresponding seasons. This leads one to postulate, that the thermal body force does play an important role in the mean lake circulation.

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Headquarters: 45 Beacon Street Boston, MA 02108-3693
DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826
amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718
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