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[Volume 15, Issue 8 \(August 1985\)](#)

Journal of Physical Oceanography

Article: pp. 1076–1084 | [Abstract](#) | [PDF \(660K\)](#)

Inertial Oscillations due to a Moving Front

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(Manuscript received January 8, 1985, in final form April 8, 1985)

DOI: 10.1175/1520-0485(1985)015<1076:IODTAM>2.0.CO;2

ABSTRACT

A solution for a concentrated line front translating at speed U is given. It is shown that the frequency is near-inertial if $U \gg c_1$, where c_1 is the long internal wave speed of the first baroclinic mode. Each more has a characteristic frequency ω_n associated with it. The spectra contain a near-inertial primary peak, composed of the higher modes, whose blue shift increases with depth. They also contain secondary peaks at higher internal wave frequencies if U is only slightly larger than c_1 . The flow field is intermittent, and involves a continuous interchange of energy between the surface layer and the stratified interior. The dominant period of this intermittency is the beating period of the first mode with a purely inertial oscillation. Short periods of apparent subinertial motion are also generated. Several features of the solution are in agreement with observations.

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