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**Entrainment rates in rotating gravity currents** MATHEW WELLS, JOHN WETTLAUFER, Department of Geology and Geophysics, Yale University —
Many marginal seas produce dense water in shallow shelf regions that are drained by gravity currents. The action of rotation, dissipation and local stratification results in a trajectory of the current at an angle to the maximum slope. The velocity of such currents scales like $U \sim g' tan(S)/f$, where $f$ is the Coriolis parameter, $g'$ the reduced gravity and $S$ the slope (Nof, 1983). In non-rotating laboratory experiments, Ellison and Turner (1959) found an entrainment ratio like $E \sim Fr$, where the Froude number is $Fr = U/\sqrt{g'h}$ and $h$ is the current thickness. Substution of the Nof velocity in the definition of the Froude number predicts that $E \sim 1/f \times \sqrt{g'/h}$, for constant $S$. We have been able to verify this new prediction in a series of rotating laboratory experiments. Both the density of the incoming fluid and the rotation rate were varied. The entrainment ratio $E$ decreased inversely with increasing Coriolis parameter $f$, and increased as the square root of the initial density anomaly $g'$; as would be expected if the flow velocity is set by a geostrophic balance. Our experiments also find to the same entrainment ratio as the Ellison and Turner (1959) experiments for the same Froude numbers.

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