



## Abstract View

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# A Simple Model of the Formation and Maintenance of the Shelf/Slope Front in the Middle Atlantic Bight

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### ABSTRACT

The strong salinity and temperature gradients across the shelf/slope front in the Middle Atlantic Bight often compensate such that the cross-front density gradient is nearly eliminated. This suggests that the density field may not be as dynamically important as has been assumed in previous models. Hypothesizing this to be the case, a simple steady model, which allows no density variations, is used to demonstrate that a strong tracer gradient may form near the break. The velocity field is such that an initially smooth tracer distribution develops a sharp front within a relatively short downstream distance. Essential features of the model are 1) the velocity convergence near the shelf break which acts to sharpen the front on the shelf side, and 2) the increase in bottom slope and depth seaward of the shelf break which leads to rapid diffusion of tracer into the deep ocean. The result is that the front is maintained for a large alongshelf distance despite both diffusion effects and the frictional decay of the alongshelf velocity.

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