



## Abstract View

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## Cross-Gyre Transports

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### ABSTRACT

What is the fate of surface Ekman transport entering a subtropical gyre through its zonal boundaries? This question is investigated by resolving interior transport of a deep surface layer into nonvortical (potential flow) and nondivergent (solenoidal) components. For an idealized 1½-layer model driven by zonal wind, explicit analytical solutions are readily found separately for the transport potential and the streamfunction of the solenoidal transport component. These, together with classical results on Sverdrup transport and the pressure field, reveal transport balances that the classical solutions tend to conceal. Application to the North Atlantic shows the necessity of massive cross-gyre transport by the western boundary current from the tropical region into the subtropical gyre, as well as from the latter to the subpolar gyre. These cross-gyre transports constitute a major conduit for the poleward flow of warm (25°C) surface water.

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