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Pathways connecting the North Brazil Current and the RAPID line

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The North Brazil Current is considered a bottleneck in the South Atlantic, responsible for funneling upper-ocean waters into the North Atlantic. This work explores the surface and subsurface pathways that connect the North Brazil Current to the RAPID line. To that extent, observational trajectories from surface drifters and Argo floats are used in conjunction with Markov chain theory and tools from dynamical systems analysis to compute probable pathways. More specifically, these pathways are computed as ensembles of paths transitioning directly between the North Brazil Current and the RAPID line. In addition, simulated trajectories will be used (1) to assess how representative the two-dimensional observational trajectories are of the three-dimensional circulation, and (2) to compute the associated volume transport of different pathways. Preliminary results suggest that two dominant pathways connect the North Brazil Current and the RAPID line. First, is the traditional pathway through the Caribbean Sea and Gulf of Mexico, which carries waters to the Florida Current, and second is a more direct route east of the Caribbean that supplies waters to the Antilles Current and the basin interior.