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The global dominance of the Atlantic circulation, seen through boundary pressures.

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The rapid propagation of boundary waves (or, equivalently, the strong influence of topography on vorticity balance) ensures that bottom pressure along the global continental slope reflects large scale ocean processes, making it possible to see through the fog of the mesoscale, which obscures many observable quantities. This fact is exploited in systems to monitor the Atlantic Meridional Overturning Circulation (AMOC). Here, we use diagnostics from an ocean model with realistic mesoscale variability to demonstrate two things. First: boundary pressures form an efficient method of monitoring AMOC variability. Second: pressures are remarkably constant along isobaths around the global continental slope, varying by less than 5 cm sea-level-equivalent over vast distances below the directly wind-driven circulation. In the latter context, the AMOC stands out as a clear exception, leading to a link between the AMOC and differences in the hydrography of entire ocean basins.