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Monitoring a large-scale Atlantic Meridional Overturning circulation in an ocean filled with eddies.

C. W. Hughes (1), R. J. Bingham (2), M. A. M. Maqueda (1), and T. Kanzow (3)

(1) Proudman Oceanographic Laboratory, Liverpool, United Kingdom (cwh@pol.ac.uk, +44 (0)151 7954801), (2) Newcastle University, Newcastle, United Kingdom, (3) Kiel University, Germany

The signal associated with a 1 sverdrup change in overturning circulation is expected to be only about 2 cm of sea-level, or 1-2 mbar of ocean bottom pressure. It is not immediately clear that such a signal should be detectable against a background mesoscale variability which may exceed 15 cm root-mean-square sea-level variability. However, we present scaling arguments which imply that the continental slope acts as a barrier to eddies. These arguments are supported by satellite altimeter measurements which show a strong minimum of variability at precisely the position predicted by the scaling argument, and a change in sea-level spectrum between the ocean and shelf sides of the slope. In the North Atlantic this is even more strongly confirmed by in-situ bottom pressure measurements over a range of 16 degrees of latitude, which detect only 2 mbar RMS variability, most of which is strongly correlated over the entire measurement range. This confirms that measurements on the continental slope are not sufficiently contaminated by mesoscale variability to mask any large-scale variations which may be present.