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Fine structure variability associated with the North Atlantic Current crossing the Mid-Atlantic Ridge

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Observational evidence for enhanced turbulent energy dissipation at sites of topography-mesoscale flow interaction indicates the possible role of fronts and eddies as energy source for mixing. Here, we analyze observations of hydrography and velocity along a section that crosses the subpolar front (SPF) in the North Atlantic west of the Mid-Atlantic Ridge. The aim is to examine the observational evidence for internal wave activity and generation in conjunction with strong geostrophic flows in the North Atlantic Current (NAC) in order to find relations between finescale variance and external properties of the mesoscale flow, and to investigate the role of topography-flow interaction for the spatial distribution of finescale variance.

The observations were made during *Maria S. Merian* cruise 9/1 in August 2008. In addition to CTD measurements, the data consist of shipboard ADCP data from a 75 kHz Ocean Surveyer and lowered ADCP data from two 300 kHz WorkHorse Monitors. Furthermore, microstructure data of current shear and temperature variance in the upper 1000 m of the water column were collected at three locations along the section (covering different flow regimes) using a loosely tethered profiler. The microstructure data are used to compare the shear variance and dissipation rates in the thermocline with estimates from lowered ADCP data. In the deeper part of the water column spectra of finescale variance of velocity shear and density strain are used as a gauge for internal wave activity.

The results indicate three different regimes along the section with highest shear variance found directly below the subpolar front, increased shear variance south, and little shear variance north of the front. Comparisons are made with newer observations obtained during *Meteor* cruise 82/2 in July 2010. During that cruise the NAC was located farther north, but the data show similarly increased shear variance in conjunction with the SPF.