Geophysical Research Abstracts
Vol. 15, EGU2013-5104, 2013
EGU General Assembly 2013

Isopycnal diffusivities from floats in the DIMES experiment

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The joint US/UK DIMES experiment (2009 to present) seeks to determine diapycnal and isopycnal diffusivities in the Southern Ocean, specifically in the region west of and including Drake Passage. To this end, a range of measurements have been made, from microstructure profiles to tracer releases to the launching of roughly 200 isopycnal subsurface floats. The results are now coming in.

We focus here on the float component. We have developed a new method for measuring cross-stream diffusivities from Lagrangian particles, and this will be discussed. We apply the method to the DIMES floats to determine meridional diffusivities west of Drake Passage. As shown, the float dispersion can be characterized as diffusive, but only after a determined period of time. For comparison, we also calculated diffusivities from synthetic floats deployed in a high resolution version of the MIT GCM. The method indicates the range of acceptable values, and these ranges are overlap for the model and data. Ongoing analyses will also be discussed.