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Discussion

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(1) Can Taylor's hypothesis be invoked to obtain shear estimates at the Fixed Intensive Array rather than 40 km off at I3 and I4?

(2) Is the eddy scale the correct one to choose for horizontal shear estimates, or would a shorter frontal scale be more appropriate?

(3) Dr Briscoe suggests that energy from the continuum flows into inertial motions. How is that energy lost?

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(1) This has been attempted, but the quality of the answer is uncertain. The I3–I4 horizontal shear estimate used here assumes a non-evolving eddy field, but is not contaminated by vertical shears. The horizontal shear estimated by using Taylor's hypothesis on W1 currents also assumes a frozen field, but is contaminated by vertical shear. The approach has merit, perhaps, but its value has not yet been studied.

(2) The original Müller analysis uses a WKBJ assumption for the mean-shear and internal wavefield scales; a 10 km or shorter frontal scale is close to violating this assumption. The frontal region would perhaps be implicit in a Taylor-hypothesis shear estimate (previous question) anyway.

(3) I don't know. Conventional wisdom would require that it go to vertical mixing and

turbulent dissipation at a very slow rate; Müller & McComas (1981) suggest 100 days. This implies a rate of loss of perhaps 0.03 mW m^{-2}, which is totally invisible in the kind of study done here.

S. A. Thorpe (*Institute of Oceanographic Sciences, Wormley, Godalming, Surrey GU8 5UB, U.K.*). What are the characteristics of internal waves produced by horizontal shears, and were these characteristics found in the waves observed? Is the estimate of ν_h consistent with other measurements in JASIN?

M. G. Briscoe. According to Müller (1977), the wavenumber–frequency dependence of the energy transfer from a large-scale shear flow into the internal wavefield, under the WKBJ approximation, is primarily at high internal-wave frequencies, and at small horizontal and vertical wavenumbers. The direction of the source energy is initially in the direction of the shear, but wave–wave interactions within the internal wavefield quickly return the field to horizontal isotropy. Müller's analysis is for vertical shear in the mean field, but is apparently applicable in concept to horizontal shear as well. None of these consequences of shear-generated internal waves have yet been examined explicitly in the JASIN data; some cannot be looked at very well.

The horizontal viscosity estimate of some 65 $m^2 s^{-1}$ I use here cannot be obtained in the same way as by Brown & Owens (1981), because of the shortness of a JASIN record and the lack of appropriate horizontal shear information. If this horizontal viscosity were truely horizontal, and isopycnals had a slope of 1:1000, then an effective vertical viscosity of 0.65×10^{-4} $m^2 s^{-1}$ would result, and this would probably not show up in the usual measurements and analyses.