

Interactive comment on “Transport of AABW through the Kane Gap, tropical NE Atlantic” by E. G. Morozov et al.

Anonymous Referee #2

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General Comments:

The work presented in this paper is interesting and suitable for publication after addressing the comments below.

I have concerns over whether the structure of the flow – and therefore the net flow – through the Kane Gap can be accurately represented from a single current meter. Mercier and Speer (1998) used at least 10 current meters in each of the Romanche and Chain fracture zones with which they could resolve both the vertical and horizontal velocity structure.

The LADCP section displayed in Figure 4 shows that the flow is not homogenous through the Kane Gap. I would like to see the corresponding sections from the other

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hydrography cruises too so that how representative of the structure each section is – this would then shed more light on whether one mooring is sufficient, or at least give some idea of the error from using just one site.

Why was only one current meter record discussed if there were three instruments deployed? From the potential temperature section shown in figure 4 and the description of the mooring it seems that 2, and maybe all 3 of the current meters will be below the 1.9°C isotherm and so be recording flow of AABW. How coherent are the current meters with each other? Again this gives some indication of the error of using the bottom current meter to infer the net flow through the gap.

Please include a mooring schematic or representation of it in Figure 4 so that it is easier to see where the current meters are relative to the data from the CTD sections. (I know it is slightly to the south of the ridge so doesn't strictly fit on the axes used, but the x axis could be changed to distance across the gap or just longitude).

Please also include a table of the CTD/LADCP derived calculations of the transport so that these can be compared more easily.

You give an estimate of the errors of the transport calculations for the LADCP sections, but not for the corresponding calculation from the current meter – as mentioned above this would be beneficial to show how representative the transport derived from a single point current meter is of the whole gap.

Specific comments:

Abstract: Assuming the net flow through the fracture zone can be sufficiently resolved from one (or three if using the whole mooring) current meter record(s) I think the discovery of a long-term mean transport that is “almost zero” (0.016Sv) should be highlighted in the abstract.

Page 542, Line 21: “measured currents at 15m from the head”. 15m seems very high and is beyond the measurement range of the Aquadopps. Do you mean you were

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using a blanking distance of 1.5m?

Page 543, Line 20-: The discussion of errors seems to come into the document in the wrong place as it states what the errors for subsequent cruises is before even stating the transport estimates from these cruises. I suggest moving this line to after the discussion of all the cruise results.

Page 543-544, Lines 28-3: What you are trying to say is not clear – to me it seems the AABW measured to the north of the gap has been subjected to more mixing (and therefore warming) than that to the south. You discuss this further at the end of the discussion section, so these paragraphs could be combined.

Page 544, Line 25: “resolve such long period and” – mismatch in pluralisation. Suggest “resolve such long periods and”

Page 549, Figure 2: It is not easy to see the different shades of grey in the potential temperature scale. I suggest using a change of symbol as well as colours if restricted to black and white figures. Also the oval of the work area is not really visible.

Page 551, Figure 4: As discussed in the general comments, I suggest changing the x-axis to be distance across the gap rather than latitude and longitude. If you prefer to continue using latitude and longitude, please make the units decimal degrees to match figures 2 and 3, or change figures 2 and 3 to degrees and minutes to match here. Also as mentioned above, please include the mooring position from the Octobe

Interactive comment on Ocean Sci. Discuss., 10, 539, 2013.