

Interactive comment on “On the variability of Florida Straits and wind driven transports at 26° N in the Atlantic Ocean” by C. P. Atkinson et al.

Anonymous Referee #2

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General Comments:

The paper is a thorough statistical analysis to the directly measured Florida Straits transport (FST) and the wind derived Ekman (ET) and Sverdrup transport (ST) at 26N. Whilst it has many interesting features I found it a very difficult read. The language use is good, but the publication reads a bit like a thesis with many unnecessary details and a lot of repetition. The results in the summary are interesting though and I recommend publication of the paper but only after some rewriting to make it more digestible.

Specific comments:

- To make the paper easier to read the discussion parts in the results sections 3 can be shortened as it is reproduced for the most part in the discussion section 4 and again

C304

summarised in the summary. Of it should go out of 4 and be in 3 only. A little overlap is acceptable but the discussion part in this paper is more of a summary of the results section and the interpretation that is usually in a discussion section forms only a small part and is again often covered in section 3.

- Section headings from section 3 onwards are not very clear and with a paper like this it is important to know immediately what the wording in the section refers to. If you took the section headings of this paper and made a table of contents with it, it will become clear how little they help to explain the logical structure of the paper. Here are examples. If section 3.1.1 is “seasonal cycle”, then 3.1.3 should be something like “transport at non-seasonal timescales”. Section 3.1.2 is a dissection of 3.1.1. If you want to keep it like that, then 3.1.1 should be “observations of the seasonal cycle” and 3.1.2 “relation of the seasonal cycle to ...” Section heading 3.1.3 is equally confusing. You describe variability of FST at other than seasonal timescales but the heading does not reflect that. It is misleading because it says “wind driven variability” and you just convinced the reader that the seasonal cycle of section 3.1.2 is wind driven. Section 3.1.4 should rather say “Influence of internal ocean transport variability”. In general, just write the headings as observations at timescales or forcings or make the difference clear and also if the forcing is just related to a certain timescale (i.e., 3.1.2) then say so.

In section 3.4 you have wind-driven again. The word “wind-driven” transports should not refer to Ekman and Sverdrup because you show the FST is likewise driven by winds. Wind-driven is used in this paper to describe just about everything and is therefore not descriptive anymore. Rather say Ekman and Sverdrup transport from NOC and Quikscat.

Now for section 4 headings. You cannot have 4.1 be the same as 3.1.1 and 4.2.1. I think you should delete the whole of section 4.1 as it seems to be mostly repetition (compare for instance page 940 line 23-24 to just two pages later page 942 line 20-21. Section headings 4.2, 4.3 and 4.4 I find again not very descriptive and I have the same

C305

problems with calling Ekman and Sverdrup transports wind-driven transports. Yes, it is wind driven, but that does not distinguish it clearly from the FST. You just called that wind-driven in heading of 3.1.3 as well. Just separate 4.3.1 and 4.3.2 out as 4.3 and 4.4. Section 4.3.1 has quite a bit of overlap with 3.3 again. Discussion should not be so much summaries of result. Overall results are already repeated in the summary. Heading 4.4.1 is again not descriptive. Which transport?

Technical comments:

Page 921, line5: One numerical model run does not convincingly “show” profound implications of an MOC shutdown on northern hemisphere climate. Either add more references or change wording to “suggest” .

Page 922, line 26. Wording is a bit weird.

Page 923. Abbreviation of NOA is after its use the first time.

Page 924. Lines 13, 22. Could you supply web addresses for the cable transport data and the NCEP page please

Page 925, line18. The disclaimer is not needed here, because the definition of Sverdrup balance remains the same whether it holds or not.

Page 925, line 10. Website reference again please.

Page 927, line 17. Black should read blue.

Page 928, lines 8-11. Strange sentence. Can you clarify please?

Page 929, line 3. It would read better is you said: “... suggesting that it is possible that some change in seasonal cycle over time occurred.”

Page 929. Line 11. You write (particularly 1982-1989). What is mean here? Sure not the difference between these two years. The sentence also needs a ‘the’ before Florida Straits.

C306

Page 930, line 10: Sentence needs refining. “Florida Straits” is a geographical area. Perhaps “to that over the Florida Straits”?

Page 931, line 21. EOF needs to be written out the first time.

Page 932, line 8-10. I don’t understand this. How can it only project in the western tropical Atlantic if the peak regression values are in the central Atlantic?

Page 932, line15. Please indicate both variables that are being correlated.

Page 932, line30. Please indicate what remote means.

Page 933, lines 2-3. This needs rewording. As written is sounds as if a very small amount of atmospheric pressure forced the FST. Did you mean “which showed negligible contribution of atmospheric forcing to the FST ...”?

Page 933. Please indicate which part of the model is spinup.

Page 935, line 2 and 6. The double referral to the secondary max sounds a bit strange.

Page 935, line14. I disagree with the interpretation of figure 9c east of 60w. There is only one minimum in March. There is a positive swing after that and not much of a dip.

Page 948. This section is more about transports of the terms of the wind-driven gyres than that of the MOC I’d say. But I can see it is presented as the MOC components because this work is motivated by the MOC observations and that is not technically incorrect.

Page 950-951. The conclusions are well written and my favourite part of the paper. Good way to end.

Figure 2: These transports should really be called transport anomalies. Say STDs are grey.

Fig 3. e,f,h,i have black spots and the colour is not defined. It might be obvious but it is not correct to say that d-f and g-i are the same as a-c if you change the colour scheme.

C307

Fig 10. Very unclear. Not really useful to have the arrows here.

Interactive comment on Ocean Sci. Discuss., 7, 919, 2010.