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# ***Interactive comment on “Thermohaline properties in the Eastern Mediterranean in the last three decades: is the basin returning to the pre-EMT situation?” by V. Cardin et al.***

**Anonymous Referee #1**

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This study addresses the evolution of hydrographic properties in the eastern Mediterranean waters since the onset of the EMT, which is a valid topic that is rather successfully assessed. On the other hand, the manuscript leaves much to be desired. The authors must concentrate on their subject, omitting sidelines, of which their treatment of the famous East Mediterranean eddies, which hardly affect the property evolution on a decadal time scale, and partly also of the Atlantic Water influence, are prominent examples. The text should be substantially reduced in size, though with adequate care on detail, and I strongly recommend the use of a less cumbersome English (I give hints on this below, but help from a specialist is required). Also some of the figures/figure captions need improvement.

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## Specific comment.

1. The Abstract states that the deep layers of the central Ionian in 2011 carry characteristics that lie between the pre-EMT and the EMT peak values (p 392, l 12). In reality, however, the waters below about 2500 m are warmer and more saline than in 2001 (Roether et al., 2007, Fig. 7f, which should represent the maximum). This shift results from a vertical transfer from layers further up (by action of the new AdDW formation?), so that in the latter layers the properties have in fact moved closer to pre-EMT values.
2. The Introduction is too long (see remarks above). Needed are only the LIW and EMDW cells, the EMT basics, the onset of new AdDW formation, and, probably, BiOS, to be followed by “aim of this paper”.
3. P394, l6: The change in the Aegean was only quite partly of “local origin”. Considering that the total release amounted to about twice the total volume of this sea (Roether et al., 2007) and that a good part of it did miss the high densities, it is clear that much water from the outside of the sea was involved.
4. P398l17: No errors are given for the ADT data, but I am sure that there are problems. The main feature I note in Fig. 1b is a distinct rise toward the African coast from which I estimate surface geostrophic current speeds of up to 1 m/s, which value is absolutely out of the question. This may be a problem of vicinity to land or of bottom topography, which may be felt also elsewhere. The ADT uncertainties must be briefly explained. - The eddies, which I noted above to be of limited relevance, come out nicely. But I was unable to identify features in the figure that are mentioned in the text further on, for example in p399l16 f. The features in question should be noted explicitly.
5. P401l1: Only the curves of two of the stations are addressed in the text. The inversion at Sta. 289 seems to indicate a rather shallow outflow. Deep outflow is only indicated at Sta. 290, but that might be due to Aegean outflow prior to 2011. A more thorough assessment is indicated.

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6. P402I28 f.: I regard the argument as conjecture.

7. P403I6, “end of the EMT”: Does the EMT only mean change between Adriatic and Aegean, or also changes in the water column, among which the latter are still in bloom??

8. P404I3 f.: The Herodotus Trough is the (relatively) deep passage, the blocking occurs from the rest of the Cretan Passage topography.

9. P404I15 : see comment #1 above

10. The figures as shown in the OSD file that i received are too small. They should at least be enlarged to fill the full width of the print. The inset maps shown in Figs. 3d, 7, and 8 are far too small.

11. Fig. 1/caption: The Herodotus Trough must be marked and “Eastern Med Ridge” is distorted in the figure. Caption: M843 is M84/3. – Change “are depicted” to “depicted as the rectangles”. – After “are identified” insert “ as a to d”

12. Figs. 2, 3, 4, 5,, 7 and 8 show numbers with parts cut off, rectify.

13. Fig. 6: The text in p402I17 f. says “front . . . 38.45°N, meant is salinity 38.45.

14. Fig. 7a: M5, not M4. Caption Fig. 7: change to M31/1, M44/4, M51/2 (same in Fig. 8, M51/2 not M71)

15. Fig. 9, Caption: “y-axes expanded in . . .”. – The vertical lines in Fig. 9c must be explained. Fig. 9c: In the two larger gaps between the vertical lines the curves show variations that are not borne out by the data. – The highly blurred topography in Fig. 9d must be amended.

16. Fig. 10: Note that the salinity difference between 1987 and 1991 is an artifact due to a salinity calibration error in the 1991 data (cf. Roether et al, 2007, Section 2 and Fig. 3)

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## Technical corrections (to many to list!)

1. P392I2: change “ongoing” to “actual status of the . . .”. –I14: I cannot understand that sentence. –I15: change variability to evolution.
2. P394I2: Change On to During the. – I19: The sentence beginning here is far too long.
3. P396I2: change to The M84/3 and P414 data sets. – I2 ff.: Shorten text appreciably. - I15: reword “entrainment”, which means admixing water during flow.
4. P398I22: replace “may” by “can”. – I25, reword to: Temperature and salinity along the quasi- . . . are shown ..”
5. P401I5: replace “out” by “outside”.
6. P403I16: permit one to study ..
7. P405I18 f.: change to: . . . Aegean origin was the principle component . . .
8. P407I13: replace scope by purpose.

etc.

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