

Interactive comment on “Changes in the Adriatic oceanographic properties induced by the Eastern Mediterranean Transient” by I. Vilibić et al.

Anonymous Referee #2

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The paper describes results from a time-series, i.e. an oceanographic section that is frequently occupied across the Adriatic Sea; the Palagruza sill transect. The time-series is very long, from 1960 to 2010 and is, as far as I can see, not extensively reported on earlier (at least not the nutrient and oxygen data). The paper reports on the physical properties as well as oxygen and nutrients. The transect is strategically located between the northern Adriatic Sea and the deeper southern part of the Adriatic. The data can therefore shed light on the circulation of the Adriatic Sea and the exchange mechanisms between the northern Adriatic and the Ionian Sea. The article is generally well written in the descriptive part, but possibly a little too speculative in the discussion/conclusion part. The paper deserves to be published by Biogeosciences after considering some suggestions, see below.

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The authors note a negative trend in dissolved oxygen (presumably found by visually inspecting figures 3-5). It would be interesting to discuss this in a little more detail, and particularly to show the linear trend in the figure, and also to give the slope of the line, with uncertainty. Is the decrease in oxygen due to changes in S/T, i.e. a solubility driven change, or is it a change also in the saturation (e.g. AOU) of oxygen? Oxygen trends in the world ocean have received a lot of attention lately so this would be valuable information. A discussion on drivers for trends would also be useful.

The authors present an impressive time series in three very nice figures where properties are shown over time. In the text, the authors discuss the correlation of low/high periods of one property (e.g. salinity) in relation to high/low concentration of another property (e.g. PO₄). Some graphic representation of these relations would be useful for the reader, for instance property/property plots over time, or something that illustrates these relations. In fact, the discussion on the observed shifts in various properties is somewhat “hand-waving”, i.e. the authors deals with observed trends and variability without reporting on the statistical significance of the changes. By simply eye-balling figures 3-5 it seems to me that several of the noted variations are not statistically significant, but without access to the data this analysis can, obviously, not be done.

For a reader not very familiar with known the circulation within the Adriatic Sea, I would encourage to extend the discussion of this, to compliment the more extensive introduction to the circulation in the Mediterranean Sea in general and for the Ionian Sea in particular.

There is already a lively debate around this manuscript regarding the possibility that intermediate waters from the Western Mediterranean Sea can be plausible transported to the Adriatic, as the authors suggest. I encourage the authors to address this more carefully, with references to other studies that show eastward flow in the Strait of Sicily etc. A more careful water mass analysis of the data on the section could be considered to support/reject that theory. I realize that some of this is already put to paper in the replies from the authors.

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Minor/editorial comments: 1. Page 929, line 5: consider citing Roether et al., 1996 (science) here.

2. Page 930, line 12-14: I do not understand why high NO₃ and PO₄ values in the “nutrient inputs” should favor a high N/P ratio. Please explain or reformulate.

3. Page 930, last line: “Estuarine surface circulation”: My understanding of the circulation into the Adriatic is that there is a significant horizontal gradient in the direction of the flow, as well as a vertical one, i.e. the eastern part of the Otranto Strait is often inflow to the Adriatic, whereas the western part is mainly outflow. This sentence does not really reflect that very well.

4. Page 934, line 8: Why talk about “eastern part of” a section that is almost entirely oriented north-to-south?

5. Page 934, line 26: “. . . increased 2-3 times in the mid. . .”. Does the authors mean “increased during 2-3 occasions”? I don’t really see an increase in PO₄ that is 2-3 times (larger than the mean), other than on a few occasions, i.e. individual data points.

6. Page 935, line 15: “deep anti-estuarine Adriatic circulation”. This might be a term that is well known for researchers familiar with the Adriatic circulation. I find it confusing, particularly in the context of my point 3 above. Please provide some text that (and references) to this theme.

7. Figures 6 and 7: What is the x-scale on these plots, it is most likely not meters (m)? Would be nice to indicate which way is north and/or south (again, it is misleading to talk about east/west part of a section that is north/south in extension).

8. Page 937, line 15: “nutrient rich inflow of LIW”: This statement is somewhat surprising to me, I was under the impression that LIW was a water mass with particularly low nutrient concentrations. Maybe I am in error here, but looking at data from the eastern Med, the density range of LIW has very low nutrient concentrations. This seems to be confirmed by your data in that the nutrients are low when salinity is high.

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