Response to the Reviewer #2 comments on the manuscript "Dense water formation in the coastal northeastern Adriatic Sea: the NAdEx 2015 experiment" by I. Vilibic et al.

General comment to the Authors: The manuscript investigates the dynamics of the coastal areas in the northeastern Adriatic Sea during winter 2015, using numerical models and in situ data. The data were collected during an intense fieldwork that was conducted using a multiplatform approach, involving ADCPs, CTDs, glider and a profiling float. In particular, the authors focus on the possibility that dense water forms even in this area of the northern Adriatic, and not only during severe winters, but also during relatively mild winter (winter 2015 in fact was one of those). The objectives of the paper are sufficiently clear but not well discussed. The structure of the paper could be better organized and the figures and captions are all relevant, but not all the data were shown. There are a number of aspects that need to be clarified to the reader, before the paper would be publishable in Ocean Science.

- Thanks for comments, we revised substantially the paper following reviewer's suggestions.

A major comment is that I don't think the authors have uniquely demonstrated that the formation of dense water occurred in the investigated area. Further you have not shown to the reader how mild was winter 2015 compared to other winters. With this in mind, I think the paper deserves publication after a major revision.

- These two issues, which are also raised by Reviewer #1, are now demonstrated. New section on DWF will be added to the revised manuscript, synthesizing all arguments regarding the DWF. The details are provided in Response to comments of the Reviewer #1.

Some more detailed comments are:
- Page 1, Line 17: should be "accompanied by"

- Ok, to be corrected.

- Page 1, Line 18: do not define acronyms in the abstract, but only later on (DWF)

- Ok, to be done.

- Page 1, Line 25: should be "to be about 1-2"

- To be corrected.

- Page 2, Line 2: should be "mixing on the"

- Ok, to be corrected.

- Page 2, Line 5: in addition to heat losses, also evaporation should be mentioned as an important contributing factor.

- Ok, to be added to the text.

- Page 2, Line 17: should be "from the eastern coastal areas".

- Ok, to be corrected.

- Page 4, Line 26: should be "The atmospheric".

- Ok, to be corrected.

- Page 7, Line 16: I think the glider measurements would be important and should be described, and shown.

- Ok, we will add to the revised manuscript a figure showing glider measurements and the text describing the measurements (Fig. 1). We agree that this figure is quite important to show the existence of the thermohaline front (among other things), which is recognized as a drawback in the manuscript.

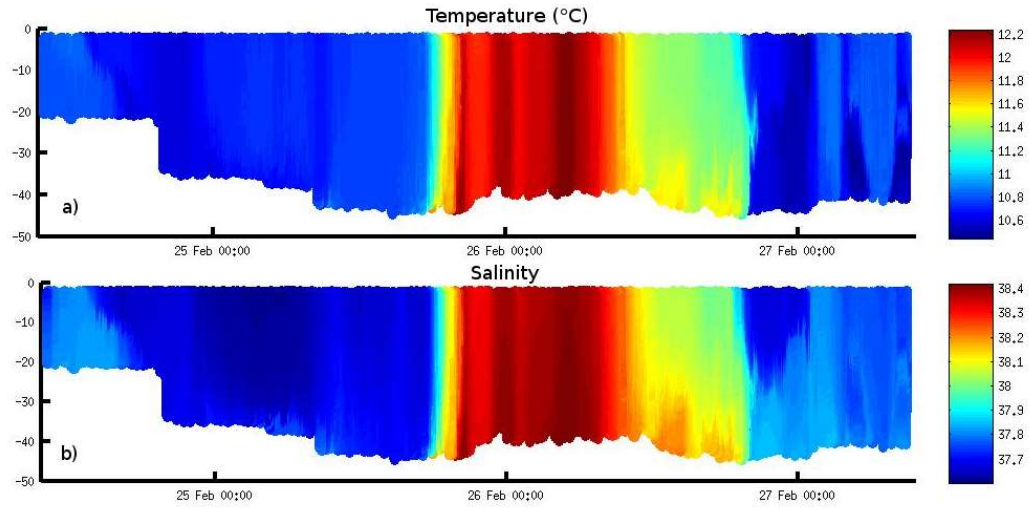

Figure 1. Temperature and salinity profiles measured by Slocum glider between 24 and 27 February 2015. The path of the glider is shown in Fig. 1 of the discussion paper.

- Page 7, Lines 9-18: My main concern here is how can you exclude that advection is the cause of what you observe here?

- Ok, we rewrote the paragraph, as the assessment of the DWF and dense water dynamics is performed later in the manuscript.

- Page 10, Lines 9-16: there seems to be a contradiction since in the first part you speak about "horizontal salinity gradients" and of the fact that "cooled waters were largely advected to this area", while afterwards you speak about "DWF in the area", which for me has not been proven in this paper.

- DWF has been occurring during transient bora episodes, lasting for a few days. As DWF is spatially inhomogeneous due to strong variation in heat losses and in freshwater load, the ocean started to relax between bora episodes through horizontal advection. We will clarify this issue in the manuscript, particularly in new section 6.3 on dense water formation.

- Page 10, Line 24-25: this sentence "acted mostly in opposite to the thermally driven buoyancy changes" is not clear at all.

- To be clarified.

- Page 12, Lines 9-22: I don't understand why you decompose the residence time in along and across and not just use the standard residence time. Besides the mathematical formulation you should give the reader a physical explanation on why you do that and why it should be important.

- Following also suggestion by Reviewer #1, we simplified the estimate of residence time and provided the result in the form of box-whiskers diagram. See Response to Reviewer #1 comments.

- Page 12, Lines 32-33: you say the in the outer basin the residence times "are much lower" (than what) and after this sentence you say that "for the inner basin … residence times are much shorter": : :.so they are short in and out, but with respect to what: : :? Really unclear!

- To be rewritten, also following changes in computations of the residence time.

- Page 13, Line19: what is the meaning of "This is a baseline Nadex 2015 paper"???

- To be deleted as not providing any information.

- Page 13, Line 22: I don't think you have demonstrated item (i)!

- We extended the analysis and provided arguments which demonstrate the occurrence of the DWF in coastal northeastern Adriatic in winter of 2015. The details are provided in the Response to comments of the Reviewer #1.

- Page 13, Line 32: what is the meaning of "has still excited thermohaline circulation"?? It sounds odd.

- To be clarified.