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Interactive comment on “The CO₂ system in the Mediterranean Sea: a basin wide perspective” by M. Álvarez et al.

Anonymous Referee #2

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GENERAL COMMENTS: This paper presents results from two cruises carried out in the Mediterranean Sea which provide a basin-wide dataset for the study of CO₂ parameters in the Mediterranean. The data treatment is sound and exhaustive and the authors perform an internal consistency analysis for the CO₂ system in the Mediterranean that can be useful for future studies. The data presented is of high quality and of interest to the science community. The paper provides a nice description of "this is what is observed". However, it would greatly improve if the authors also added some information explaining why and how those values are observed. Furthermore, if it is to be used as a staple reference for future studies it must include a comparison to previous studies, to put it in perspective. SPECIFIC COMMENTS: My main concerns with this work are the following: 1) This is mostly a descriptive paper, it does little more than present the values measured in the cruise. The manuscript would greatly improve

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with some interpretation of the results. 2) The information obtained from the data, the actual science in the paper, is lost among the lengthy descriptions of the values measured. I would suggest shortening the descriptive part, e.g. eliminating station descriptions, and highlighting the interpretation of the measurements. 3) If this paper is to be used as a "benchmark" for future studies of CO₂ in the Mediterranean, like the authors claim, it should incorporate the results from all the previous studies in the area. I was surprised to find the authors think a comparison with previously available data is "out of the scope of the manuscript" (page 1459, line 20). 4) The descriptions of the water masses are often difficult to follow, with long, convoluted sentences. Apparently a more detailed description of the water masses is done in the paper by Hainbucher et al. (2013), but the reference is missing from the bibliography. In terms of the CO₂ parameters alone, I am not convinced that it makes sense to have that many water masses. This section would benefit from a table summarizing all the water masses and their CO₂ characteristics, similar to table 2. It would also help to indicate the location of the water masses (or at least the main ones) in a plot. Minor comments: Page 1458, line 12: since the decrease in pH is hard to detect, is it significant? Pages 1470 to 1472: Are the differences between stations so important that they merit almost a station by station description, even within the same sub-basin? TECHNICAL CORRECTIONS: There are some editing mistakes (punctuation, verb agreement, etc). These should be easy to correct upon going through the text with fresh eyes. Section 4.1.1 has one section for Meteor data (mostly discussing water masses) and one for the Sardinia Sicily Passage. It would make more sense to either specify cruises or regions regardless of cruise. The section could be shortened or rewritten more clearly. Page 1458, lines 9-10: Rephrase "...species in the through the center..." Page 1461, Lines 10 to 20: very convoluted. please rewrite with shorter sentences. Page 1466, line 10: the use of consequently indicates that there is more information to come: consequently, what happens? Rephrase. Page 1466, line 19: correct figure number from 22 to 12. Page 1468, line 8-10: "so deep waters from the Ionian..." this sentence is incomplete.

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