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Biogeosciences Discussions

Interactive comment on "Distributions of the carbonate system properties, anthropogenic CO_2, and acidification during the 2008 BOUM cruise (Mediterranean Sea)" *by* F. Touratier et al.

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Distributions of the carbonate system properties, anthropogenic CO2, and acidification during the 2008 BOUM cruise (Mediterranean Sea)

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We would like to post a comment on this manuscript because overall we think the

results regarding the anthropogenic carbon content in the Mediterranean Sea is a bit misleading despite using a very nice, probably accurate (details not given in the ms), and valuable data set of CO2 observations in the Med Sea, which is currently under-sampled with regard to the carbonate system.

In general this ms. seems to be another claim supporting the advantages of the TrOCA method to estimate CANT in the ocean. Since the authors arethe originators of this methodology have the right to use the method and advocate for its benefits. However they are doing this in a very subjective way. A careful assessment of the caveats and advantages of the TrOCA method specifically applied to the Med Sea is lacking and we think is compulsory in this analysis. TrOCA is only compared with the MIX approach, which is also proposed by the same authors.

While regional results for CANT TrOCA are supported by other methods, like ïĄĎC*, TTD, LM, etc. . . (references in the ms) the ms clearly avoids commenting on Yool et al. (BG, 2010) that certainly question the applicability of the TrOCA method and evaluates its caveats in an objective way.

In the context of the Med Sea, discussing and supporting two methodologies for CANT, TrOCA and MIX developed by the same authors and disregarding the others without including any expert of the other methodologies as an author is quite suspicious. The only argument on favour of CANT TrOCA in this ms is that is supported by MIX, and the MIX results are just presented, there is no single data supporting the reliability of the MIX results both for water masses, biogeochemical tracers used, etc..

In any sort of multiparameter analysis designed to discern the mixing of water masses, a careful assessment of the reliability and robustness of the results should be given, and here is completely lacking.

Another issue concerns the thermodynamic probability of such high CANT numbers in the Med Sea: This offers another way of exploring the reliability of the MIX and TrOCA estimations in the Med Sea that could be helpful, but unfortunately this is not

considered nor discussed in the manuscript.

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