We thank both referees and the editor for their constructive comments. Below we reply to the comments point by point. Our responses are in bold. Pages and lines from our replies (in brackets) correspond to the pdf of the revised manuscript.

Can the authors put their finding in perspective with the SOCAT QC procedures? In particular they show a relatively poor comparison of pCO_2 measurements by two systems on board the same ship (+/- 20 µatm) while SOCAT QC procedures aim at cross-overs of VOS lines better than 5 µatm.
We have added a sentence to the ms to relate our results to SOCAT criteria: "The maximum pCO_2 discrepancies observed in our study (up to 20 µatm) are larger than the 5 µatm criterion for cross-over discrepancies in order to achieve flag A status (the highest quality) in the new SOCAT version 3 (Wanninkhof et al., 2013), further emphasising the desirability of following the recommendation of this paper." (13, 27-31)

1.15. P 2804 L13: provide reference(s) to back statement "strong gradients in temperature, salinity and pCO2"
The sentence now reads: "strong gradients in temperature, salinity and chemical variables (Rérolle et al., 2014)". (P. 11, 18-19)
* COMMENT : Please refer to independent references to back this statement, the paper by Rérolle et al. (2014) is an auto-citation, and strong gradients in temp, salinity and pCO_2 in shelf seas were shown in publications at least one decade before the paper by Rérolle.
We have added (Körtzinger et al., 1996; Bozec et al., 2005). (11, 19-20)

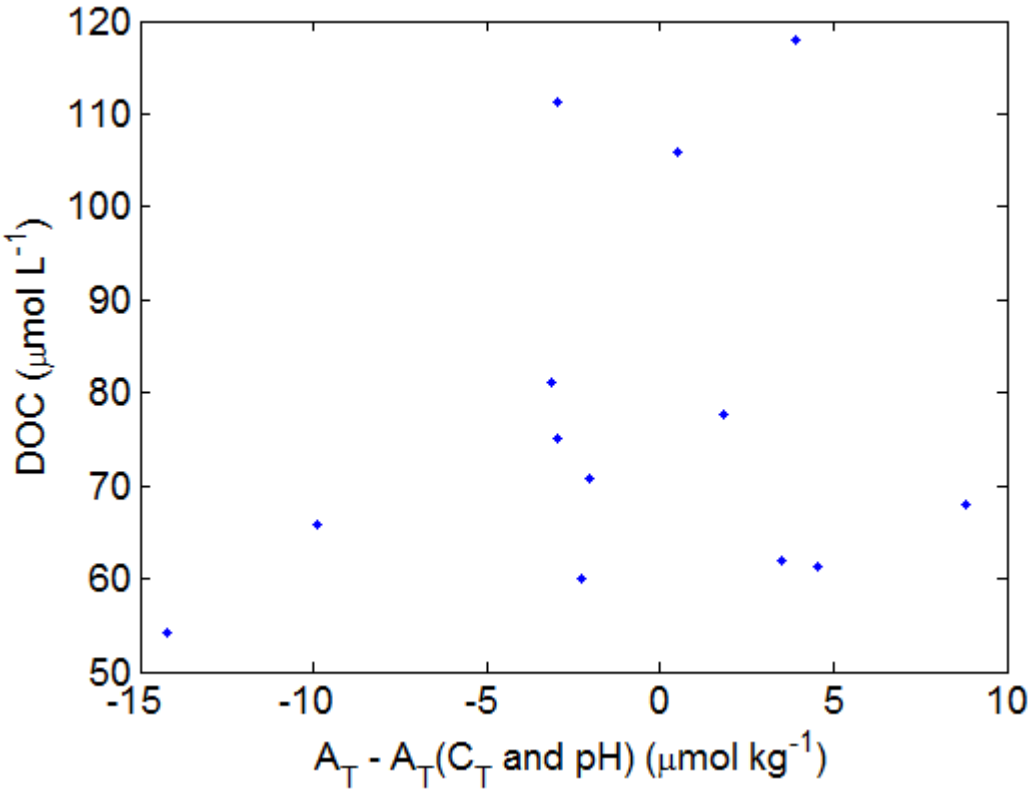
1.22. P2809: "complete shielding from light" will not prevent bacterial growth
We no longer mention microbial growth and now the sentence reads as follow: "c) prevention of phototrophic growth in the equilibrator by complete shielding from light." (P. 17, 3)
* COMMENT : Yes, but the fact of shielding from light does not guarantee that there is no biological alteration of the measurements, since there can still be bacterial activity in absence of light in the pipes and equilibrator
The reviewer is of course correct. We have modified the sentence to read "c) prevention of phototrophic growth in the equilibrator by complete shielding from light, although non-phototrophic microbial growth will not be prevented. It should be noted that shading of the equilibrator will not stop respiration in the pipes or equilibrator. The latter can be calculated assuming a residence time of 12 minutes (2 minutes in the ship's pipe network and 10 minutes in the equilibrator), community respiration of 54 µmol L^{-1} d^{-1} in shelf sea waters (highest rate in Holligan et al. (1984)) and a respiratory quotient of 1. This 'worst case' scenario results in the production of 0.4 µmol L^{-1} DIC which equates to 0.75 µatm pCO_2, using the average A_T, C_T, SST, salinity, Silicate and Phosphate concentrations from D366 (calculated using CO2SYS). This value is clearly within the uncertainty of our measurements. Nevertheless, regular cleaning of the equilibrator and pipe network, where possible, is recommended in order to prevent the build-up of microbial mats and associated respiration."

1.28. Finally, there are several papers that have raised the issue of the impact of organic acids on computations of the CO2 system in coastal waters. I'm surprised these aspects are not mentioned/discussed (Koeve & Oschlies 2012; Kim et al. 2006; Muller & Bleie 2008; Kim & Lee 2009; Hernández-Ayón et al. 2007).

We have added to the discussion: “Several papers have raised the issue of the impact of organic acids on computations of the CO_2 system in coastal waters (Kim et al., 2006; Hernández-Ayón et al., 2007; Kim and Lee, 2009). Dissolved organic matter produced by phytoplankton during photosynthesis can potentially make a significant contribution to seawater total alkalinity although we saw no evidence for this in our study (analysis not shown).” (P. 15, 10-14)

* COMMENT : This is an important issue regarding CO_2 measurements in coastal waters, and if the authors can demonstration that in their data-set there was no influence of organic acids, then this fully deserves to be shown in the paper, and being set aside with an « analysis not shown »

We have added a new figure (figure 5) and extended our discussion of this matter “Several papers have raised the issue of the impact of organic acids on computations of the CO_2 system in coastal waters (Kim et al., 2006; Hernández-Ayón et al., 2007; Muller and Bleie, 2008; Kim and Lee, 2009). Dissolved organic matter (DOM) produced by phytoplankton during photosynthesis potentially makes a significant contribution to seawater total alkalinity, the magnitude of which has been reported to vary depending on the phytoplankton species (Kim and Lee, 2009). Dissolved organic matter in this context acts as an additional acid-base pair in seawater. Analytically, this would interfere with our determination of A_T (by HCl titration). We can therefore compare measured A_T values to the respective calculated values from e.g. C_T and pH. As shown in Fig. 5, there is only a weak correlation ($r^2 = 0.06$) between dissolved organic carbon (DOC) and A_T discrepancy, of the sign we should expect if DOM was affecting A_T but not statistically significant. Similar results were as also obtained in an upwelling environment (Loucaides et al., 2012). Therefore, we found no evidence of a significant contribution to seawater total alkalinity from DOM.” (15, 15-26)



P1 lines 16-17: What is an "ocean acidification cruise"? Reword please!

We do not see why the wording is problematic but in any case have reworded to "cruise aimed at investigating ocean acidification impacts". (1, 16-17)

P12 line 9: Brackets are confusing, are they really necessary?
Brackets have been removed (12, 11).

P14 lines 21-26: This seems not at all connected to the rest of the manuscript. How do your results compare to those of Lueker et al. (2000)? Also, the grammatical structure of the paragraph could get improved.
We have edited the paragraph in question to improve the grammatical structure and make it clearer why we compare to Lueker et al. (2000): "Lueker et al. (2000) carried out a similar field-based intercomparison with comparable measurement quality and overall uncertainty. At lower fCO_2, Lueker et al's differences between calculated and measured fCO_2 were slightly lower than in our study, but at high fCO_2 they obtained slightly higher differences. Lueker et al. (2000) reported that the mean relative difference between measured fCO_2 and fCO_2 calculated from C_T and A_T (for fCO_2 less than 500 µatm) was 0.07 % (standard deviation = 0.50 %). For fCO_2 above 500 µatm, there was a mean relative difference of 3.3 % (standard deviation = 1.2 %). For example, for an fCO_2 of 500 µatm this corresponds to a difference of 16.5 µatm and a standard deviation of 6.0 µatm." (14, 24-32)

P16 line 7: "some cruise" should read "same cruise".

Done (16, 19)

Please provide the link to your data in BODC.

This link was already in the ms:
https://www.bodc.ac.uk/data/published_data_library/catalogue/10.5285/f56e35bc-635e-0ab5-e044-000b5de50f38/ (8, 15-16)

Whenever appropriate, make sure that you cite all the relevant papers of the special issue.

We have already cited Poulton et al. (2014), Rérolle et al. (2014) and Young et al. (2014).

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Young, J. R., Poulton, A. J., and Tyrrell, T.: Morphology of Emiliania huxleyi coccoliths on the North West European shelf – is there an influence of carbonate chemistry?, Biogeosciences Discuss., 11, 4531-4561, 10.5194/bgd-11-4531-2014, 2014.