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Interactive comment on “Short term variability of dissolved lipid classes during summer to autumn transition in the Ligurian sea (NW Mediterranean)” by M. Goutx et al.

M. Goutx et al.

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Final Author comments in response to the referee remarks on the manuscript entitled :

“ Short term variability of dissolved lipid classes during summer to autumn transition in the Ligurian sea (NW Mediterranean) by Goutx et al.

We greatly thank both reviewers for their carefull reviewing of the manuscript, and the detailed and constructive comments. All comments will be taken into consideration, which will certainly improve the quality and understanding of the study presented here.

Reviewer 1 (C. Parrish) General comments: By their very nature dissolved lipids are

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difficult to work with, consequently there are limited data for the marine environment. This manuscript describes the variability in a wide range of dissolved lipid classes in the context of an even wider range of supporting data. The authors have clearly made the most of the results from their comprehensive sampling program by providing an extensive discussion.

Specific comments of the referee are underlined, author answer is not. p29 | 12 What is cs-170? Chlorophyll cs-170 is a chlorophyll pigment, the structure of which is a little different from chlorophyll a and that is mostly found in picoplankton cells. This will be explained in the text of the revised version (rv).

| 14 What are the Lipid metabolites Lipid metabolites are alcohols, free fatty acids and diglycerides; they will be detailed in the text of the rv.

| 18 . . . zooplankton wax ester (WE) biomarkers . . . What about steryl esters (SE)? We do not separate WE from SE. Literature reports that they are both linked to the presence of zooplankton (Sargent, 1978 Science Prog Oxf, 65; Caveletto et al. 1989 L&O, 34; Kattner, 1989 Comp. Biochem. Physiol, 94). For a seek of clarity we will replace the acronym WE by WSE (for Wax and Steryl esters) throughout the manuscript and reference on the distribution of wax and steryl esters in dissolved lipids will be given.

| 26 Which are the biogenic lipids? Biogenic lipids are total lipids not including hydrocarbon. This will be explained in the revised version, we will also use the term LT-HC and LT homogeneously throughout the manuscript as required by the referee 2.

| 27 While phosphoglycerides is certainly a correct term, glycerophospholipids is more commonly used. Also are you sure all your phospholipids are indeed glycerol-based? Yes our phospholipids are all glycerol-based by reference to our standards and our separation scheme.

p30 | 5,6 . . . a major source of DOM, which is primarily composed of proteins,

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carbohydrates and lipids . . . Is it really? The term primarily is misleading. The text will be changed according to both referee 1 and 2 remarks.

I 7 . . . biomolecules, their resistance to remineralization and their transformation . . . An interesting combination of properties. OK

I 9 . . . a small proportion (<11%) of DOM is identifiable . . . This seems to contradict the earlier DOM statement. The text will be re-written according to both referee's comments on this section

I 20,21 . . . triglycerides . . . The correct term is now triacylglycerols. OK

p31 I 3 . . . Dissolved lipids are operationally defined by GF/F 0.7 μ m membranes . . . This is probably a bit too explicit as some authors use different cut-offs. In any case GF/F is a glass-fibre not a membrane filter. Why not just say filter? OK

I 20 . . . Parrish et al., 1995). Not a good reference for this point; Liu et al. would be better. OK

p32 I 10 . . . 90 samples . . . A good data set. I agree!

21-26 Would it be useful to tabulate this information? Not necessarily.

p33 I 7,8 Give the diameter of the filters. OK

I 12 . . . internal standard (hexadecan-3-one (?)) . . . Did you use the same concentration each time? If so what was it? What was it dissolved in? Did you check for interferences in your sample types? None were found in samples from the northwest Atlantic (J. Chromatogr. 262:103) but some algae do synthesize ketones (Mar. Biol. 133:461). Details will be given in Material and Methods according to this comments.

p34 I 1 . . . steryl esters co-eluting with wax esters . . . This is the only time you mention this: Is it enough? For almost the entire paper you call this band WE. Admittedly particulate lipids in the Atlantic usually contain much more WE than SE (Nature 286:798; J. Chromatogr. Sci. 39:146), but this is not always the case (Nature

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286:798; Lipids 17:831). What do we know about dissolved wax versus steryl esters?
see answer to comment P29 I18

I 1-6 This is a very broad range of classes. Ok

p35 I 23 . . . succession of wind gusts from opposite directions: SW, NE and SW occurred. . . Over what periods of time? Details will be added

p36 I 9,10 Explain LSW and JD. OK

I 23,24 . . . TLd concentrations varied from . . . On what basis did you calculate molarity? Molarity is calculated on the basis of the molecular weight of the reference standard for each class of lipids, and then summarized. Details of calculation will be given.

p37 I 3 The day/night TLd profiles were not significantly different(?) . . . Did you test this statistically or do you mean there were no obvious or discernable differences? All comparisons are based on ANOVA statistics. Our choice was to give the result of ANOVA when it is significant only. However considering the remark on Table 3 p 58, we will include negative results also.

I 14 . . . The only significant increase in DOC . . . Again do you mean this in a statistical sense? Not here. According to this comment and to the referee2 comment, the sentence will be changed. "The only significant re-increase of DOC" will be replaced by "The only small re-increase of DOC ". In addition, more details on DOC analytical precision are given in Mat & Methods.

p38 I 1,2 . . . and pigments), triacylglycerols, wax and steryl esters and metabolites . . . You should probably list the metabolites here too. OK I 4 . . . the glycolipids (monogalactosyl diacylglycerols) . . . What about DGDG and SQDG? DGDG are not often identified in our samples. SQDG are not separated from the deposit in our separation scheme.

I 5 . . . pigments, monoacylglycerols and non-nitrogen containing phospholipids OK

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I 26 . . . (normalized to a 150 m depth water column . . . Would it be more straightforward to calculate an average concentration based on integrated values? OK

p39 I 17 . . . results reflected the . . . The rest of the Results section is quite discursive. This part of the result section will be clarified.

p43 I 6 . . . bacterial production was significantly correlated . . . Did you measure bacterial production? Do you show these significant correlations?

I 25 . . . acids and alcohols (Gurr and James, 1980) . . . I am not sure what is being said here. In this context, I think Gurr and James talk mainly about lipases working fastest on triacylglycerols and slowest on monoacylglycerols.

p45 I 3 . . . hydrocarbon to depth . . . Perhaps you mean petroleum? Yes

I 9 . . . the high HC proportion . . . Yes this is very high. OK I 15 . . . in total carbon, most lipids being in the form of membrane phospholipids . . . What about lipopolysaccharides? Will be discussed.

I 27 . . . does not support the idea that these PL would represent the only BB increase. The phospholipid . . . BB? OK

p46 I 10 . . . shelter phospholipids . . . An interesting term. p58 This table is already too complicated, but you could indicate the magnitude of the values that were not significant. Some people might be interested in the sign of a particular relationship, others might be interested in how strong or weak a relationship is, even if $p > .05$. OK

p62 Explain the dotted line. OK p63 Should the symbols be different? Not necessarily

p64 Should the title be Total Lipids (% DOC)? I am not sure what the extrapolation statement means here or in Fig 7. OK

p68 What are the P values? OK $p < 0.01$ will be given

Technical corrections The Authors acknowledge the referee for providing detailed technical corrections that will be taken into consideration in the revised version of the

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