Our reply to referee's comments is incorporated in referee's text.

Anonymous Referee #3
Received and published: 2 September 2015
The manuscript is a valuable scientific contribution to the understanding of hydrological and biological conditions in the northern Adriatic. Based on long-term data of those relevant environmental parameters authors tried to predict fluctuations in phytoplankton components. The authors are aware of the fact that the described processes are extremely complex and the considered parameters extremely variable and that far more work should be done in order to more reliably predict circulation regime and consequently, phytoplankton abundance. However, authors approach to this problem is original and brings a new perspective to the ecological processes that occurs in so highly complex marine environment such as northern Adriatic. Given the above, it is my opinion that the manuscript is worth publishing after minor corrections.

Comments:
The title "Factors favouring large organic production..." suggests that the manuscript deals with the living and non-living organic matter. As the authors focus more on the living (Phytoplankton) component, I suggest changing the title to better correspond to the presentation of the results.
The title has been changed to: „Factors favouring phytoplankton blooms in the northern Adriatic: Towards the northern Adriatic empirical ecological model".

So far I have not met with the presentation of the level of significance of 80%; a common way of presentation the level of significance is greater than 95%. If the authors decided to show these results there must be a reason, so it is necessary to explain why.
Although statistical significance of 95 % is commonly used, one tends to use lower significances in cases when one wants to recognise even slight indications of the factors which could induce some processes and/or impacts. For example, in previous paper (Kraus and Supić, 2011) we based some of our findings on 80 % significant correlations, same as Zhang and Wang, 2013, who analyzed changes in North Atlantic circulation and surface temperature. We believe that in environmental investigations in which many processes interplay and affect each other even lower correlations between data points to important relations between them. We investigated numerous correlations between various environmental parameters and time lags in order to find the ones which best explains the ecosystem functioning. Found correlations of 80 % indicate we are on the right track. We would like to point out that, in our opinion, one of the most important findings of our paper is the fact that evaporation in November is correlated to phytoplankton abundance and circulation in next February, with significance between 86 % and 90 % (Fig. 10). The indication of our findings were previously presented in Supić and Vilibić, 2006 and Supić et al., 2012, where relation between autumn and next winter circulation were discussed. Furthermore, in independent research, by Santojanni et al., 2006, high correlations were observed between autumn conditions and next year anchovy stock estimate.
The discussion above is included also in new version of our ms, in discussion and conclusions.
(Zhang, L., Wang, C.: Multidecadal North Atlantic sea surface temperature and Atlantic Meridional Overturning Circulation variability in CMIP5 historical simulations, J. Geophys. Res. Oceans, 10, 118, 2013.)

It is needed to specify the meaning of abbreviations C1, F1 and PA somewhere in the text. I suppose PA stands for phytoplankton abundance, so maybe just to put the abbreviation in the brackets few lines before. C1 and F1 is explained in the caption of figure 10, but still to be able to easily follow the text, I suggest to repeat the meaning.

Abbreviation PA was completely removed from ms as it was used only in caption of Table 1. We used "phytoplankton abundance" throughout the entire ms.

*In order to have a more understandable abbreviations, instead of **C1** and **F1** we use several new abbreviations:*

xPC1 *– for the first main component of PC1 analysis performed on the inter-annual changes in: surface geostrophic currents relative to 30 m between the six stations of the Po River – Rovinj profile (**cPC1**), phytoplankton abundance - original values (**pPC1**) and log transformed values (**lpPC1**).*

xPCA *– for PCA scores resulting from the PCA analyses on inter-annual changes in: surface geostrophic currents relative to 30 m between the six stations of the Po River – Rovinj profile (**cPCA**), phytoplankton abundance - original values (**pPCA**) and log transformed values (**lpPCA**).*

Although the subject of this manuscript is not a prediction of anchovies abundance in the northern Adriatic, the authors refer to the fact that a "good understanding of the processes in the ecosystem can potentially be of great importance in maintaining sustainable fishery". In my opinion such predictions should be considered with much more caution, given the extremely complex relationships in the food web. The higher up the food web we go, the more parameters must be taken into account, and therefore the error is greater.

The sentence was replaced with: "…we already showed at the example of anchovies (Kraus and Supić, 2011; Kraus et al., submitted) that understanding of the driving forces of phytoplankton production in the ecosystem represent firm basis for research in other fields of marine research, such as fishery."
Kraus, R., Supić, N., Lučić, D., Njire, J.: Impact of winter oceanographic conditions on zooplankton abundance in northern Adriatic with implications on Adriatic Anchovy Stock prognosis. Submitted.

Technical corrections:
Page 1222, line 18. correct "show melting" to "snow".
Corrected.

Table 1. Caption. Insert abbreviation PA after phytoplankton abundance.
Abbreviation PA was completely removed from ms as it was used only in caption of Table 1. We used "phytoplankton abundance" throughout the entire ms.
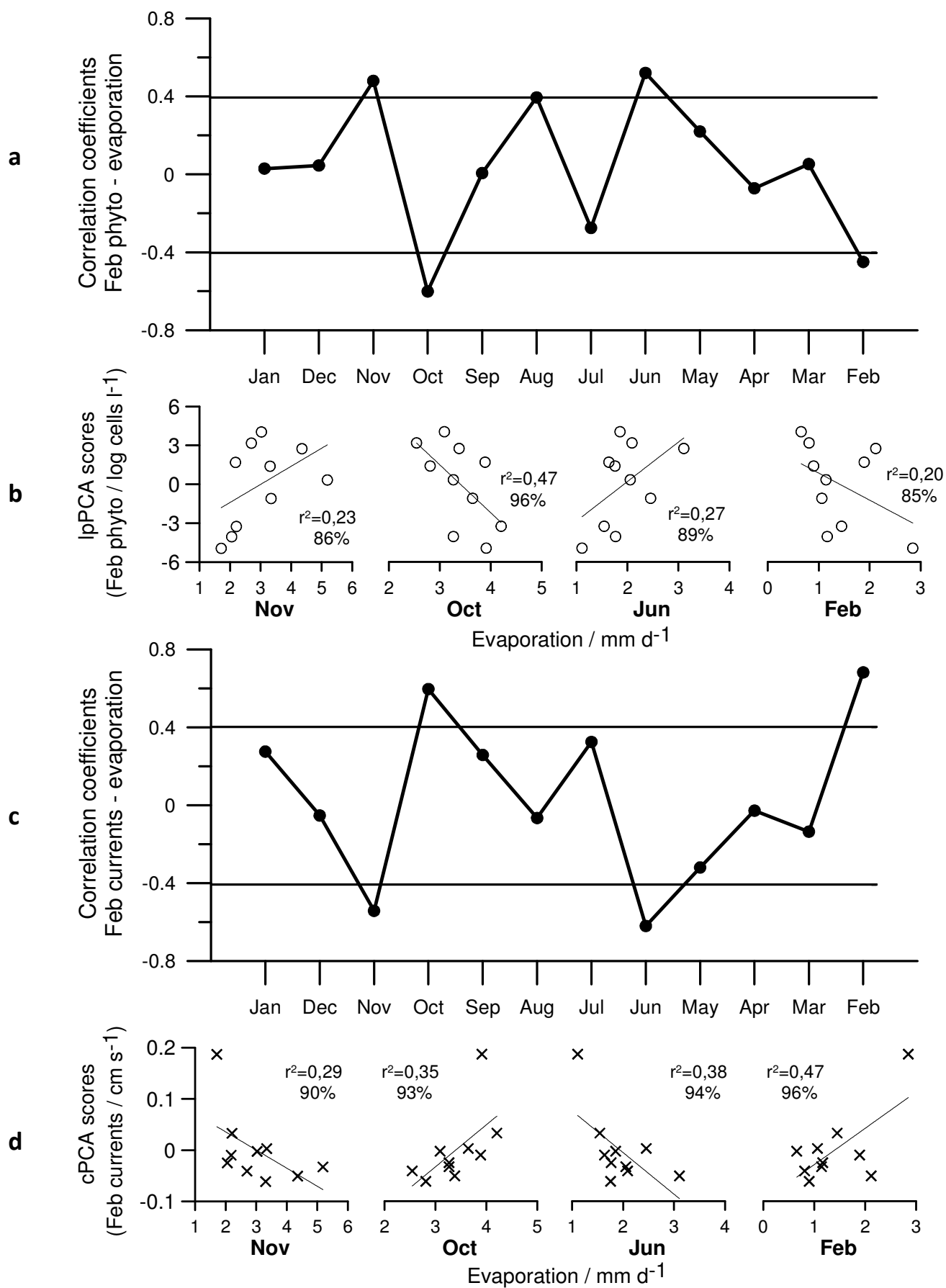
Please find changed figure 10 attached.

Figure 10

Figure 10. Correlation coefficients and lpPCA scores of February (log values of phytoplankton; a and b) and cPCA (geostrophic currents; c and d) against monthly averages of evaporation of the previous year during the analysed period (1989-2004) at the Po River delta-Rovinj profile (a and c). Correlations in November, October, June and February are given graphically (b and d). (We point out that after removal of 2004 data, which were of extreme values, the November correlation slightly decreases, October correlation strengthens while June and February correlations significantly reduce. However, in extreme situations relations between processes become more pronounced and thus should not be removed in computation of correlations, as was discussed earlier by Kraus and Supić, 2011.)