Ocean Science
Discussions
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Interactive comment on "Factors favouring large organic production in the northern Adriatic: towards the northern Adriatic empirical ecological model" *by* R. Kraus et al.

Anonymous Referee #1

Received and published: 4 August 2015

General comments

The aim of the manuscript is to identify possible prerequisites, occurred in the preceding year, for explaining phytoplankton blooms in the Northern Adriatic Sea. The authors consider a long time data series from 1990 to 2004 and use PCA for detecting patterns and long term changes in phytoplankton distribution and current fields.

The authors try to reconstruct the phytoplankton blooms in the North Adriatic Sea from the combination of preconditioning factors: circulation pattern, Po river discharge, precipitation and evaporation.

The approach to integrate the forcing of some of the main drivers in order to explain

the monthly variability of phytoplankton abundance is a relevant attempt towards an understanding of the phytoplankton dynamics in the Northern Adriatic sea.

Wind direction and intensity should have been taken into account in the data analysis. The absence of wind forcing is a lack as this is an important driver for the blooming of many phytoplankton species as well as for determining the stratification rupture and mixing.

The title "Factor favouring large organic production" is misleading as the authors deal mainly with the normal succession of phytoplankton blooms and not with the dynamic of organic matter (dissolved and particulate) and with the balance among bioproduction , degradation, terrestrial inputs and loss by advection/sedimentation. I suggest that "Factors favouring phytoplankton blooms in the Northern Adriatic Sea" would be more appropriate.

The dependence of phytoplankton abundances on the interaction of some forcing occurred up to 1 year in advance is questionable as it is based also on a low (80 %) level of significance. I would suggest revising the manuscript considering only the correlations with 95 % of significance. Why the authors do not consider a data set updated to more recent years (i.e to 2013 or 2014?) and just re-analysis a data set already considered in a previous publication (Kraus and Supic, 2011)? If they could have a much longer time series it would be relevant to know if their findings are confirmed on a longer time scale.

The authors in many part of the discussion and interpretation of their data consider the stratification conditions without analyzing or presenting any data about this relevant oceanographic feature which is important in the seasonal dynamics of the phytoplankton blooms (e.g. chapter 4.3).

Minor comments

P. 1220, L. 6 I suggest to avoid "at the transect" as it is not clear and it is not necessary

to outline the sampling strategy in the abstract.

P.1220, L.23. A reference supporting that the North Adriatic is the one of most productive regions in the Mediterranean sea, would be useful.

P.122, L.20. The authors cite Krajcar 2003, but these features were described well in advance by Franco and Michelato (1992) and by Cushman Roisin et al. (2001).

P.1221, L. 29. The appropriate term to use is "organic matter" and not "organic materials".

P.1222, L. 23. I suggest specifying "marine" environment.

P.1222, L.25 I suggest to simplify the sentence substituting "as it is the change in the Ionian Sea circulation" with: "as the inversion of the Ionian Sea circulation"

P.1227 L. 21. I suggest to write in extenso the title of the chapter : the ICCC.

P.1231, L. 6, L.9. Correct "precondited" with "preconditioned".

P1233, L. 3. Unclear what is "February C1".

P.1233, L. 6. I suggest to substitute "is felt at the eastern part" with "it reaches the eastern part".

P.1234, L.12. and L.13. I suggest to substitute "high freshwater pressure" with "high freshwater discharge".

P.1235, L. 2. What do the authors mean for "more dynamic years"?

P. 1236, L. 13. I suggest to substitute "more often winter anticyclonic circulation" with "more frequent. . .".

P. 1236, L. 20 "and give more support our findings" insert "to" before our findings.

P.1241. Table 1 Caption. What is PA sampling? For the comments about the too low significance of 80% see the general comments,

P. 1249. Figure 1. Caption. Map of the northern Adriatic. . .. I suggest to add "Sea" after Adriatic.

P.1255-6. Figure 5 and 6. Captions. Correct "1989-2014" with "1989-2004".

P.1257. Figure 7. The numbers on the contour levels are unreadable. Please enlarge the character .

P.1262. Figure 10. It would be useful to show also the significance of the regression lines.

References

Franco, P; Michelato,A. 1992. Northern Adriatic Sea: oceanography of the basin proper and of the western coastal zone. Science of the Total Environment, Supplement, 35-62.

Cushman-Roisin B., Gacic M., Poulain P.-M., Artegiani A. 2001. Physical Oceanography of the Adriatic Sea: Past, Present and Future. Kluwer Academic Publishers.

Interactive comment on Ocean Sci. Discuss., 12, 1219, 2015.