

Review on

General aspects

This paper reports the Utermöhl plankton in the Tropical West Pacific at almost identical stations across latitudes from the equator to 20°N., in the autumn of three successive years, 2016, 2017 and 2018, aboard the flagship of the PLC's ocean research fleet, the R.V. *Keshue*. Identification was reported only according to broad groups. Samples were taken throughout the water column from 5 to 200 m. Over an essentially 2D transect from south to north, with a minor dog leg north of the Philippines.

The taxonomic and physico-chemical data were explored by several statistical tools, the Structural Equation Model (SEM), PCA, RDA, and Bray-Curtiss Analysis. As well as fitting the standard physico-chemical parameters of nitrate, nitrite, phosphate, silicate, T and S, the authors systematically computed a Vertical Stratification Index (VSI), including this parameter in statistical treatments.

The paper presents: T/S data as x-y surface and x-z sections for each of the 3 years (Fig. 2); variation in VSI from south to north over the 3 years (Fig. 3); surface phyto abundance (Fig. 4); x-z distribution of phyto abundance over 3 years (Fig. 5); broad taxonomic relative abundance distribution (dinos, diatoms, cyanos, chrysos) over all stations, pooled for the 3 years (Fig. 6), 2D PCA diagram of the stations (Fig. 7); 2D RDA diagrams (Fig. 8). These analyses are used by the authors to show clearly that the study area divides into 4 groups, A, B, C and D. In Fig 9 whisker boxes are used to show the distribution of T, S and VSI in each group, which is a very nice feature, and very clearly presented. Fig. 10 is used to present results of the SEM, indicating the statistically computed quantified effects (apparent effects?) of T and S on VSI (of course) and of T, S and VSI on DIN, DIP and phytoplankton. This is very original, as far as I am aware. Fig. 11 is used to explore the effects of DIN and DIP (particularly the N:P ratio, on phytoplankton of the four major taxa in the 4 regions at 3 depths (surface, DCM, and 200 m). It clearly shows different effects of N and P on the phytoplankton community structure in the different ecosystems corresponding to these three chosen depths.

There follows a Discussion rich, original and well argued.

However, in contrast to all this quality the introduction is terrible, and totally inappropriately targeted. While the authors have done an excellent job for the Methods, the Results and the Discussion, they need to scrap the Introduction completely and write it again. The same goes for the Abstract. If this is done well, this manuscript would constitute an important and original contribution.

Specific aspects

Title

OK

Abstract

TERRIBLE.

Introduction

TERRIBLE. (See above).

Materials and Methods

THIS SECTION IS MOSTLY EXCELLENT.

P3L26 "PE" > "polyethylene"

P4L11 Insert reference for the Utermöhl method.

L11-20 In this section state the minimum size of organisms identified and counted

L23 “AA3 (SEAL., German(y))” Give bibliographic reference or web site.

P5L15 “average” of temperature and salinity: give the precise dataset for which the average was computed.

L28 “the three years”

Results

THIS SECTION IS MOSTLY EXCELLENT.

P7L9 “the same” > “a similar”

P8L5 Delete “variation in” (repetition)

L12 “variability” > “variation”

L16 “showed a relatively uniform” > “varied little from year to year in their”

L17-18 “extending...” > with a minor abundance peak at about 10°N.”

L18-19 “The abnormally...” > “This abundance peak was associated...”

L20 “observed also...”

L21 “in southern Taiwan” > “south of Taiwan”

P9L1 Delete «As can be seen from the figure,”

L3 “regional variations in latitude” > “variations with latitude”

L5-6 Delete “, and...” (Repetition)

L11-13 “...the lower phytoplankton abundance was mostly dominated by...”

L19 “... little interannual difference between species, ...”

L26 “4.8” > “4.8%”; “1.4” > “1.4%”

L29-30 Delete “The horizontal..” It’s already marked on the figure 7.

P11 L14 “methanogens” This seems to be a mistake.

L26 Insert “here,” before “the phytoplankton”

P12L6 “3.4” > “3.6”

L8 “... of the sample from 5 m above” Seems to be a spurious insertion. Delete.

L12-13 “The strong spatial variability...” > “Fig. 9 shows clear variation in T-S.”

L14-15 number of VSIs” > “values of VSI”

L15 “was > “were”

L16 Delete “There were... groups”

L18 “linearly fitted to temperature” > “related to temperature”

L19 Delete “The fitting results showed that the”

L20-21 Delete “It can be noted that the”

L21 “more” > “most”

P13L7 “3.6” > “3.7”

L7 “parameter” > “parameters”

P14L14 At the end of this light you may like to add, “and growth may have become increasingly limited by light.”

Discussion

VERY GOOD DISCUSSION.

P15L1 “Kuroshio” > “The Kuroshio”

L1 “WPWP” Add this to Fig. 1.

L1 After “interaction” insert “and climate modulation”

L14 “the vertical trawl” > “vertical hauls”

L24 “acquisition of nutrient strategies” > “ nutrient acquisition strategies”

L25-26 "... dinoflagellates use mixotrophy, engulfing prey as well as feeding using peduncles and palia, while phosphorus..."

L28 "was" > "is"

P16L2 "Fig. 11" > "Fig. 6"

L3-4 "... has already been demonstrated (Grosskopf et al., 2012; ..."

L4 "The presence of slight" > "The virtual absence"

L9 "were" > "are"

L9 "susceptible" > "affected"

L11 "across" > "along"

L12 "indicated" > "indicates"

L13 "indicated" > "indicates"

L16 "competition is reduced as light limitation kicks in, and the nutrient ratio approaches..."

L17 "nutrients partly affected..." > "nutrient ratios thus affect..."

L20 Around here, it might be good to very briefly mention the possibility of limitation by other nutrients such as iron. Also mention, if you like, that some of the phytoplankton sampled may have recently sunk from upper layers, and therefore represent the nutrient rations and T-S of these layers. You, the authors, may have a feeling for this in the present work.

L22-24 Delete "With global... structure". It's too speculative.

L24 Delete "typical"

L24 "severe" > "strong"

L25-28 "... the interannual variation of phytoplankton was not significant. It remained stably oligotrophic, and the vertical stratification structure determined that of environmental resources such as nutrients, thus forming four contrasting environments, each with its characteristic phytoplankton community structure." [I think you can't say that stratification produced the T-S environment. In any case there is no need to say it.]

L31-34 "... from the deep layer below the thermocline, which affects the N:P ratio, and restricts vertical migration as well as physiologically affecting the vertical structure of phytoplankton growth and mortality."

L37 "has been" > "is"

L38 Delete "since the 1960s"

L39 "is suitable for living" > "thrives"

P17L1 "*Trichodesmium*" needs italics

L2 "believe" > "have proposed"

L4 "believe" > "suggest"

L5 "also is consistent"

L6 "where the temperature was not restricted," > "where the surface temperatures all exceeded 20°C.,"

L7 "higher than in those with lower temperatures"

L8-21 based on the data you present and other knowledge, the present referee is not entirely convinced by the authors' arguments, but the authors should have the right to interpret their data in this way if they so choose.

L10 "high-value area" > "high abundance"

L20 "severe" > "strong"

L25-27 "A strong coupling exists among the nutrient supply rate, the photosynthetic performance of phytoplankton (Bouan et al., 2006), the phytoplankton biomass and primary production, particularly in eutrophic areas (Richardson et al., 2019)." Delete "which directly limits nutrient supply"

L28 "causes" > "effects"

L28 "in" > "on"

L34 "which" > "and"

L35 "demonstrated" > "demonstrate"

L37 Delete "the survival of"

L38 "poor activity" Do you mean "low mobility"?

L38-39 “in the circulation and water with high nutrient content” > “in mixed water with high nutrient content”

L40 After “C and D regions”, insert “(Fig. 9b)”

L40 “the” > “relative”

L41-43 I don’t understand what you mean in this sentence.

P18 L4 Delete “which was not discussed in this article”

L5 “further investigated”

Conclusions

P19L9 Delete “typical”

L14 “variability” > “variation”

L15 “Structural Equation Model (SEM)”

L17 After “oligotrophic”, insert “sea area”

Acknowledgements

L26 “We thank”

References

I not that given names and family names are inverted in the first reference ,“Mitra, A. and Flynn, K.J.”

Please check all references.

Figures, Tables

The figures and tables are all very good.

Fig. 7 needs more contrast.