

**Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)**

**Journal: Biogeosciences Discuss.**

**Title: Diazotrophic Trichodesmium impact on UV-Vis radiance and pigment composition in the South West tropical Pacific**

**Author(s): Dupouy et al.**

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**MS Type: Research Article**

**\noindent{\bf General comments}\**

The authors have satisfactorily addressed my comments from the initial review, and I thank them for making this effort. In my opinion the revised manuscript is much improved and better conveys the results of their study.

I have only one minor comment and a few technical corrections on the revised manuscript, all easily addressed, which the authors may wish to consider for the final version.

**\noindent{\bf Specific comments}\**

Line 407: I would say the fits of nLw vs. Chla at 305 and 325 nm from OUTPACE are different from BIOSOPE, but are they necessarily “better”? Can you provide a reason why the relationships are different in these bands but not other UV bands (e.g., 340, 380 nm)? Is it related to the presence of Trichodesmium, or some other constituent covarying with Chl?

We have added a new paragraph in the text to explain these results. In the present study, Chla was well correlated to all nLw ( $\lambda$ ) ratios [nLw ( $\lambda$ )/nLw (565)] with  $r^2$  varying from 0.79 to 0.83 (power regressions) with RMSE (not shown) ranging from from 51 to 30% from 305 to 490 nm for OUTPACE and from 36 to 23% for BIOSOPE) according to wavelength considered (Fig. 11). The relationships between nLw ( $\lambda$ ) and Chla were different at OUTPACE than at BIOSOPE (Fig. 11). These good relationships obtained even in the UV domain, where Chla though absorbing at 380 nm does not show any absorption peak in the UV domain, were already observed in the South East Pacific during BIOSOPE cruise, for equivalent ranges, and attributed to the fact that CDM substances

absorbing in the UV domain covary with Chla (Tedetti et al., 2010). The reason why the relationships are different at 305 and 325 nm wavelengths but not other UV bands (e.g., 340, 380 nm) is probably related to the presence of *Trichodesmium* and other constituent covarying with Chl and absorbing more at 305 and 325 nm than at longer UV wavelengths. It can be noted than for the same Chla, ratios are higher at OUTPACE than at BIOSOPE, i.e. absorption would be lower in the 305 and 325 nm bands and this difference is stronger at high Chla (rich stations in the upwelling at BIOSOPE, MA stations and LDB at OUTPACE). One possible reason is that CDOM and CDM may be higher in the coastal upwelling or Marquesias waters than in the *Trichodesmium* rich-waters of OUTPACE.

**Technical corrections**

Line 282: Here the surface TChla “accumulation” for station LDB is stated as  $1 \text{ mg m}^{-3}$ , yet in Table 1 the surface value is given as 0.433, the Fig. 2 legend states it is 0.42, and Line 299 again states it is 0.433. I suspect that by “accumulation” you are referring to some depth-integrated value, if that is the case please make it clear. These small inconsistencies confused this reader at least.

Corrected.

Line 329: Unless I am mistaken, Fig. 4a is not derived from HPLC pigments, as suggested by this sentence, but from the UVP measurements.

Corrected

Line 417: I realize it’s rounding approximation, but the sum of the two PCs as written (81 + 13) is 94%, not 93%. The same comment applies to Line 429 (89 + 7 = 96%, not 95%).

Corrected