Interactive comment on "Diazotrophic Trichodesmium influence on ocean color and pigment composition in the South West tropical Pacific" by Cécile Dupouy et al.

Anonymous Referee #1
Received and published: 15 February 2018

General comments: Trichodesmium and optical properties were investigated by comprehensive observation of the South West tropical Pacific waters. This paper seems to have some halfway conclusions, but gives valuable information to help future progress of the understanding of Trichodesmium bloom and its monitoring.

Answer: We agree with the Reviewer. Hence, in the revised manuscript we strengthened our conclusions :

- We found that 60% of Chla and 55% of zeaxanthin was attributed to Trichodesmiumin the western pat of the transect, that the UVP5 provided a true Trichodesmium abundance linked to the filaments abundance by a factor of aggregation of 600-900, and that the UV-Vis free fall Satlantic radiometer radiance field was influenced by the presence of the Trichodesmium colonies especially in the greenish blue and yellowish green domain.

New results of additional PCAs have been included in order to improve our results of radiance anomalies. A first, we did a PCA on radiances and other parameters of OUTPACE than simple Chla, i.e. with zeaxanthin, phycoerythrin > 10 µm, and with UVP5 colony abundance. At second, we performed a PCA on the particulate absorption coefficient, Ap, vs UVP5. Last, we carried out PCAs on the backscattering coefficient at 550nm and radiances for both OUTPACE and BIOSOPE which showed the correlation between the radiance at 565nm and bbp(550). Moreover, we compared the anomalies in greenish blue and yellowish green radiance indicated by the PCA, with results of empirically modeled radiance found in the literature (Subramaniam et al., 1999, 2002).

Specific comments:
Line 53-54: "Trichodesmium detection should then involve examination of nLw at the green and yellow wavelengths.": 490nm is in between blue and green (greenish blue), and 565nm is in between green and yellow (yellowish green).

Answer: We agree with the Reviewer. In the revised manuscript, we thus replaced: "blue" by "greenish blue" and "yellow" by "yellowish green".

Line 411-412, "It showed large troughs due to absorption maxima at these wavelengths at the blue channel (Fig. 6a-d).": "(Fig. 6a-d)" is wrong?

Answer: We corrected this sentence by saying: "It showed large troughs due to absorption maxima at these wavelengths, which were stronger at the blue channel". Backscattering coefficients are described at Figure 8 a) b).

Line 455-456, "81% of total variance": 81% in fig. 12 a).

Answer: Corrected.

Line 459, "PC2 represents 9.4% of the total variance." 13% in fig. 12 a)
Answer: It is 13%.

Line 467, "only 5% for PC2 (Fig. 12c).": 7% in fig. 12 c).
Answer: It is 7%

line 509-511: The sentence seems to be duplicated.
Answer: Yes indeed. In the revised manuscript we removed the duplicated sentence.

Fig.1, "Chlorophyll composite from MODIS on the period of the OUTPACE cruise. The positions of the short (long) duration stations are shown by cross (plus) symbols.": I could not see the "cross (plus) symbols."
Answer: Corrected. The map does not show crosses.

Fig. 4: a) to d) are not shown
Answer: In the revised manuscript, we have included the lettering of each part of Fig 4.

Fig. 7 a): Please explain the colors of black and red.
Answer: We explained now in the new figure and in the legend, that the black is for the relationship between PE and UVP5 colony abundance, and the red is for the relationship between Chla and UVP5 colony abundance.

Fig.8: Please show wavelength on the axis instead of log (log10?) values.
Answer: Corrected. We made the modification in the revised manuscript.

Fig. 9, "a) In situ absorption spectrum of Trichodesmum rich waters as measured by the filter technique showing MAA's absorption at 330 and 360 nm wavelengths": I could not see "MAA's absorption at 330 and 360 nm" in this figure.

Answer: We are sorry for this mistake (legends have been inverted in the final version of the figure). Indeed, $a_P(330)$ is on the upper panel and $a_P(440)$ is in the lower panel. This is now corrected.