**Biogeosciences
Discussions**

# *Interactive comment on* "From the shape of the vertical profile of in vivo fluorescence to Chlorophyll-$a$ concentration" *by* A. Mignot et al.

**Anonymous Referee #1**

Received and published: 16 June 2011

The aim of this manuscript is to develop a model for estimating Chl a concentration profile from in vivo fluorescence profile. The authors derived the empirical models by using the measured data in various open-ocean regions and showed that the models were able to roughly estimate Chl a profiles.

The relationship between profiles of in vivo fluorescence and Chl a concentration is well known. The utility of this ms was to go further in the analysis of uncalibrated fluorescence profiles. Overall this ms is well written, and it provides useful information since the autonomous observations of fluorescence profiles are used increasingly as means of estimating Chl distributions. However, in order to improve the quality of this ms, a number of points need to be clarified and certain statements require further justification. They are as follows.

SPECIFIC COMMENTS:

P5, 3-5: Please provide reference for Zpd.

P6, 21: the sentence "All fluorescence and …...  calibrated and validated." This sentence is too ambiguous.

P9, 13-15: Why were there the Gaussian profiles under eutrophic conditions?

P10, 14-17: the sentence "Several studies (Herland …...  upper layer, Chlsurf." This sentence is difficult to read. Rewrite.

P10, 17-20: If the increase in water transparency was due to decrease in Chl concentrations, [Chlze] would not increase with deepening of Ze.

P11, 13-24: I would like to have seen some attempt to examine the direct relationships between Zm, Chlsurf and Chlzm(column integrated content with Zm).  It would have been informative to present some attempt so that the reader can assess the differences with the previous studies.

P11, 26-28: You should properly explain about the daytime-fluorescence quenching because this process is important for the relationship between in vivo fluorescence and Chl a concentration.

P12, 13-21: the sentence "For gaussian profiles, …...  and Olipac curuies)." Unclear. This sentence needs to rewritten. Also, explain why Zmax remains poorly scattered.

P14, 15-16: How did you derive the equations 10 and 11?

P14, 22-25: Please show the error in the regression slope between Fc and F. Also, was there a difference in slopes among the oceanic regions?

P15, 15-27:  You should describe more carefully about the results of statistical analysis. For example, the r2 alone is no statistical meaning. What are the meanings of RMSE and APD in this study?  Why are the Chla-calibrated fluorescence values underestimated for gaussian profiles and overestimated for sigmoid profiles?

P16, 24-28: the sentences "For given trophic …...  of global relevance." Unclear. Please rewrite to clarify.

TECHNICAL CORRECTIONS:

P2, Equation 1: Typographical errors of units (E, not d-1 but s-1 or time-1; a*, not m-2 but m2).
P9, 13: Miswriting "r2= 0, 59".