**Biogeosciences
Discussions**

# *Interactive comment on* "Using satellite-derived backscattering coefficients in addition to chlorophyll data to constrain a simple marine biogeochemical model" *by* H. Kettle

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First of all, many thanks to the reviewer for taking the time to review this manuscript.

General Comments

I hope I have dealt with some of the reviewers concerns by the new Fig 7 which shows quite clearly whether or not the parameters are well constrained. I have also removed the discussion on export production and air-sea CO2 flux, and included more units in the descriptions of the satellite algorithms. I have also changed the conclusions of the paper - please see new conclusions section.

Specific comments

p4206 L16 I have now removed line from abstract

p4202 L26 yes sorry, I have amended the text to 'possibly resurfacing up to hundreds of years later'.

P4202 L 1-2 I have amended the text to sinking below the thermocline.

P4204 L3 IOP is defined in the abstract but I have defined it again for clarity and I have put 'absorption coefficient' in the text also now.

P4204 L15 I think it is clear that it is real data.

P4205 L6 It is normalised to the vertical but I have not changed this in the text as it is a standard remote sensing term.

P4206 sorry it is not independent of lambda, this is for 490nm - I have now changed the text.

P4206 L7 Have now added mg m^-3 for chl units.

P4206 L9-12 Following comments from other reviewers too I have simplified this section to avoid confusion.

P4207 L11 Yes good point - I have changed this now.

P4207 L19 yes the units have now been corrected to m/d

p4209 L3 now changed to 'half saturation'

p4210 L15 why is the analysis restricted to z90? That is a good question. I think that it is the standard approach but you are right if I was running the GA again I would not restrict it to this range. Unfortunately I can not run the GA again due to CPU constraints. I do not think it will significantly change the results though as I am mainly interested in wavelengths at 490nm and it is the shorter wavelengths (400nm) that will be lost by cutting off at z90.

p4211 L1 No the optimisation is performed separately at each site - this has now been made clearer. The variance is over the entire time period - this has been added to the text.

P4213 L4 A figure showing the results from the GA has now been added (fig 4).