

Interactive comment on “Optical remote sensing of the Gulf of Gabès – relation between turbidity, Secchi depth and total suspended matter” by R. Katlane Essersi et al.

R. Katlane Essersi et al.

katlanerim@yahoo.fr

Received and published: 23 December 2010

the responses are mentioned after each comment of Anonymous Referee #1

This paper presents a very interesting topic on bio-optical models for case II waters which are geographically constrained but have been adapted to THE GULF OF GABÈS. The authors use satellite data and in-situ measurements to validate the models. Overall – Structure of the paper is ok but the classical structure and terms would make it more easy to follow (Introduction, Study Site, Methods(split into sections for the algorithms, etc), Results and Discussion, Conclusion) –The section names could be rephrased –

C598

Response: The sections have been renamed accordingly.

There is little reference to peer reviewed literature to support the findings of this study which could suggest to reader its guess work or will leave the good research open to more critics please provide some peer reviewed literature

Response: Literatures references have been added to the text to support the finding of this works, e.g.: Althuis IJ. A. :Suspended Particulate Matter detection in the North Sea by hyper spectral airborne remote sensing. Aquatic Ecology 32: 93–98, 1998 Morel, A. and Prieur L. : Analysis of variations in ocean color. Limnol. Oceanogr., 22(4), 709-722 , 1977.

Management can be on a short to long term but it is not clear from this study if the results or methods can be used only for a short term or can also be used on a long term. –

Response: In this study we adopted the methodology elaborated for the validation of algorithms TU TSM applied for the North Sea area. These latest were used for the mapping and the monitoring of TSM and TU in the Gulf of Gabès. In order to construct a long term model for this studied area, the algorithms have to be recalibrated and validated with several in-situ measurements and for a long period.

This journal is open access and therefore material submitted here should be clear and straight to the point that is to say this paper assumes a certain reader level which is unfair for students getting into the topic. E.g. what is a semi-empirical algorithm at least give reference or explain in a sentence that will be great you can also reference Morel and Gordon 1980 which explain all classical algorithms

Response: the semi empirical algorithms provide direct relationships between ratio of remote sensing reflectance or water leaving radiances and seawater constituent (turbidity, total suspended mater, chlorophyll. . .)

In the figures and tables its always usefull to be uniform in the number of decimal digits

C599

you have and scales

Response: corrected as suggested

The paragraphs are sometimes too short and could be combined

Response: Thank you for the advice I tried to combine some paragraphs to give a more coherent idea.

Figures - The coordinates in Fig 1 are not clear would be nice to see the values - Caption for Fig. 1. Is not satisfactory maybe rephrase –

Response: The figure was corrected as suggested.

The plots in Fig. 2. and Fig.4. the minor and major axis distort the scatter plot suggest its better to remove them - The scatter data point should be smaller so that reader can clearly visualise - In Fig. 2. the y-axis label is not fully readable and a space is missing before the open bracket same applies for x-axis –

Response: The plot was adjusted following your suggestions.

In Fig. 4. the scaling is different than in Fig. 2. and if the scatter points were small then it would be above 0 on the y-axis. - The x-axis must be easy to read for any plot look at Fig. 4.

Response: The figure was corrected.

Border lines for Fig. 3. Are recommended to be consistent with Fig 3.(g). - Uniform tick marks position and border line compare Fig.5. and Fig. 6.

Response: The figure was adjusted.

please modify - Maybe rephrase all caption so that every figure can be understood even without the paper text.

Response: All captions were rephrased for a better understanding of the topic.

C600

Fig. 3. In plot (e and f) why is there a scale is it different for other images in this figure??

Response: A different scale is given for each different parameter. A single radiance scale is given for the radiance plots a), b) and c). Separate AOT, reflectance and TU scales are given respectively for maps e), f) and g).

Fig. 5. The scale is better on the right end side

Response: the scale bar was adjusted

Equations - $R_{(RS)}$ its nice to have the RS part subscripted as in standard literature papers - Its always nice to have equations separate from text e.g. page 1771 line 24

Response: The style of the equation was corrected.

Specific Abstract : - The idea of an abstract is to briefly summarize the whole paper(i.e introduction, methods, results and conclusion) – First and second sentence can be combined to make a straightforward explanation. Response: The abstract was reformulated thank you for the advice.

1. Introduction - Rephrase line 21 to 22 because ocean colours is for case 1 waters and 'optical...of water' can be substituted by using the term IOPs –

Response: The sentence was corrected as suggested, The ocean colors data and the development of semi empirical algorithms in case II water provide direct relationships between ratios of remote sensing reflectance of water leaving radiances. These offers the possibility of the detection of components of water especially suspended matter (Morel and al 1983) to estimate water quality and the propagation of the pollution in this area”.

Page 1769 suggest use of full name and then acronym for MODIS in line 3 - Suggest use of 'region' or 'waters' instead of 'water' –

Response: Corrected as advised.

C601

In line 9, R(RS) the (RS) is subscripted in capital –

Response: Corrected following your recommendations.

In line 12 instead of using ‘ocean ...’ since we are in case 2 waters maybe use the ‘water leaving radiance’ or ‘satellite optical sensing product ... $R_{(RS)}$ ’

Response: Corrected as proposed.

In line 14 you mention ‘to adapt a semi-....’ would be nice to know which other models you are referencing to since case 2 bio-optical models are region specific – Response: Reformulated to be clear

In line 15 you go on to say ‘...these models.’ which models? your models in this paper or the other models from other authors would be nice to be clear here

Response: For this study we used the model applied in the North Sea as analogue of the Gulf of Gabès.

1.1 Regional Settings - I suggest this is placed under methods or as study site –

Response: Corrected as advised.

In line 20 and 21 you say ‘..to the south’ and ‘..to the north.’ of what? which area? i understand here but maybe it’s better you are more clear to avoid confusion –

Response: Corrected as advised.

I suggest a redo of the section, more related to the topic and specific to the purposes of the study, e.g. why you use optical measurements in the area and more about the site which is related to optical sensing

Response: This part are reformulated and placed in the introduction section

2.1 Satellite Data - The use of acronyms is worthless if the full meaning is not available e.g. OBPG what does it mean? its always nice to be clear and avoid the reader to always search for material in your report online or in books when you can simply provide

C602

it

Response: Corrected as suggested.

i do not understand why you mention ‘.. bio-optical algorithms.’ In line 11 page 1770? Is it given in L1B? Be clear and specific –

Response: Thus are derived from L1 radiance data after a series of processing starting by a geolocation, radiometric calibration and atmospheric correction to extract water leaving radiance. Finally a bioptical algorithm is applied to derived bioptical products such as chlorophyll, turbidity, total suspended matter

line 24 it would be nice to know which version of ENVI you used

Response: ENVI 4.1

from line 20 to line 5 of page 1771 it would be nice to use numbered explanation instead of words ‘.. Firstly... Lastly’ the reader is likely to get lost

Response: This part of the text was rephrased for a better understanding of the topic.

2.2 In situ measurements - It is possible to combine sentence one and two –

Response: Corrected as recommended.

For the second sentence please provide references to support the statement –

Response: Corrected as advised.

In line 13 page 1771 it would be nice to know the accuracy of the device – Response: Rephrased for a better understanding. In line 14 please provide the secchi disk specifications so that other peers can compare or be critic to your study –

Response: The Secchi disk specifications and references were added to the text.

With the sampled water it would be nice to know the sample volume and how many times the filters were rinsed at least other readers can compare methods or you can

C603

simply reference Grasshoff et al. 1999 protocol on seawater analysis

Response: The sample volume is about 3000-4000 ml and the filtrate was rinsed once. These information were added to the text. For the in-situ sampling method we used the same technique as applied in the North Sea. The full details of the method are found in REVAMP protocols in (Tilstone, G. and al, 2002)

3. Results and discussions 3.1 in situ measurements - A peer reviewed comparison would be nice for result of R2 in line 24

Response: This part are added in text

Page 1772 rephrase line 1 and 2 not clear - '...high turbidity comes...' maybe use 'likely' - Line 6 do you mean extent? - '..depends on current.....' do you mean current as in 'present' or 'water current'

Response: I mean Water current.

3.2 Satellite Data - Page 1772 line 16 why do you mentions the algorithms are for Case II when you haven't mentioned which water class we are dealing in? maybe you need to state this in the study site or introduction –

Response: Corrected as suggested.

Line 21 to 24 suggest it be rephrased not only sunglint leads to data contaminations you also have shallow depth for areas influenced by tides maybe look at Kay et al 2009

Response: The sunglint affects all the images especially during the summer which leads to useless images with insufficient quantity of data in the images. In the other side, the effect of shallow depth and the fact that the area of study is highly influences by the tides, leads to an overestimated data. This was demonstrated by Jaque and al. 1999.

3.2.1 Images of 5 July 2009 - I am not sure how line 5 to 16 page 1773 are connected to the paper? Be clear and straight to the point –

C604

Response: In this part I wanted to explain the adopted methodology for the interpretation of the images and also check the atmospheric correction elaborated by the NASA in order to control the water reflectance data. An example is given for one image before the full multitemporal composite is shown.

Page 1774 line 5 'the centre of Gulf ... higher...' why ?maybe explain or at least give reference. –

Response: This part are reformulated to be clear "The derived TU distribution map established for the 5th of July 2009 (Fig.3g) and the other processed images for 2009 ; shows maximum value of about 10 NTU around the Kneiss, Kerkennah and Jerba islands. This could be caused by the important effect of tide and also the sea bottom reflection due to a shallow and transparency water. Then the region of Gannouch and the centre of the Gulf shows value which doesn't exceed 7 NTU"

Line 15 maybe better if you give reference to support your findings of 68.9%

Response: This part are reformulated to be clear

3.2.2 2009 turbidity map - Line 19 page 1774 maybe use 'mean annual for 2009.' -

Response: Corrected as suggested.

Why is there a small variability as explained in line 26 page 1774? –

Response: The annual mean distribution map and the standard deviation map of turbidity for 2009, shows both a high value of NTU and also a high variability around the islands.

Page 1775 line 4 maybe use 'relatively' instead of 'more or less' - End of line 4 '..industrial waste..' did you collect industrial waste samples or water samples from the industrial waste area?

Response: The samples were collected near the industrial waste area

C605

4. Summary and recommendation - Page 1775 line 14 do you mean relationship or something else by ‘..relation...’ –

Response : Yes I mean relationship "In situ data and the relationship established between the measurements parameters"

Line 16 what do you mean by ‘..surestimation..’ –

Response: Sorry I mean overestimation

Line 20 to 23 better rephrase

Response: Rephrased for a better understanding

Acknowledgements - Line 2 its better to use we than I since you are more than 1 author

References - Please use full names instead of abbreviations since the names are not widely known and the journals –

Response: Ok thanks

Burollet et al. 1979 reference is it in French or Tunisie - I am not sure but for the other references is Tunisie the language or the country as my google search didnt not give anything

Response: yes this reference is in French Burollet P. F., Clairefond P., Winnock E. : La mer Pélagienne (étude sédimentologique et écologique du plateau tunisien et du golfe de Gabès). Géol. méditerranéenne, Ann. Univ. Provence 6(1): 1-345 + cartes, 1979.

Please also note the supplement to this comment:

<http://www.ocean-sci-discuss.net/7/C598/2010/osd-7-C598-2010-supplement.pdf>

Interactive comment on Ocean Sci. Discuss., 7, 1767, 2010.

C606

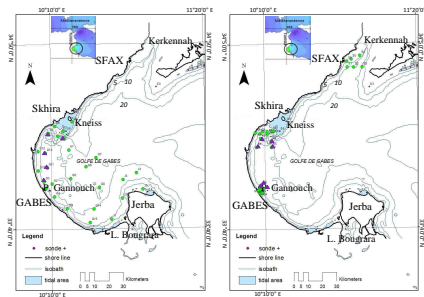
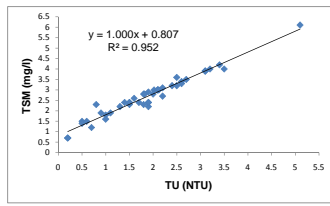


Fig. 1.

C607



2

Fig. 2.

C608

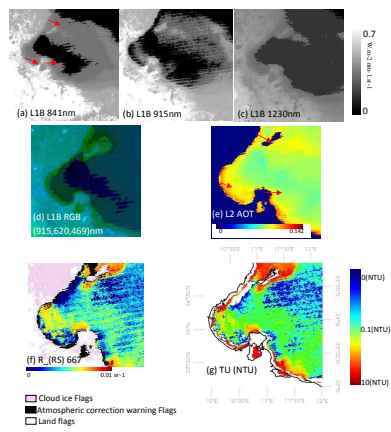
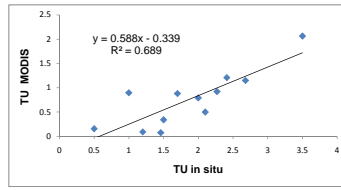


Fig. 3.

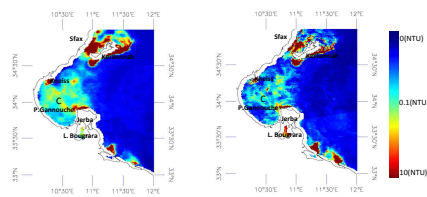
C609



4

Fig. 4.

C610



5

Fig. 5.

C611

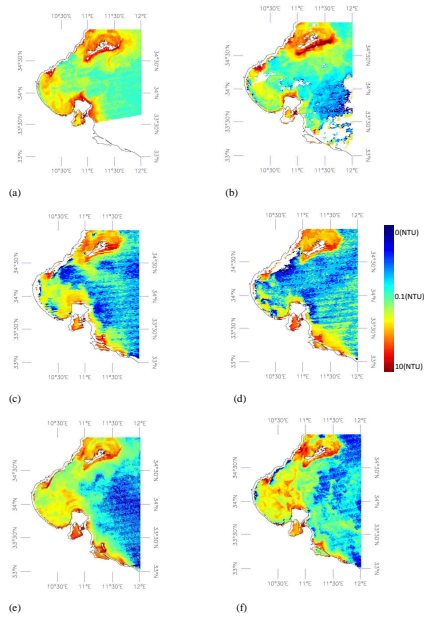


Fig. 6.