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# ***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.***

**Anonymous Referee #1**

Received and published: 18 October 2010

## OPTICAL REMOTE SENSING OF THE GULF OF GABÈS RELATION BETWEEN TURBIDITY, SECCHI DEPTH AND TOTAL SUSPENDED MATTER

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

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rephrased - 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 - 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. - 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 - In the figures and tables its always usefull to be uniform in the number of decimal digits you have and scales - The paragraphs are sometimes too short and could be combined

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 - 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 clearely 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 - 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. - 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. please modify - Maybe rephrase all caption so that every figure can be understood even without the paper text. - Fig. 3. In plot (e and f) why is there a scale is it different for other images in this figure?? - Fig. 5. The scale is better on the right end side

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

Specific Abstract : - The idea of an abstract is to briefly summarize the whole paper(i.e

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introduction, methods, results and conclusion) - First and second sentence can be combined to make a straightforward explanation.

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 - Page 1769 suggest use of full name and then acronym for MODIS in line 3 - Suggest use of 'region' or 'waters' instead of 'water' - In line 9, R(RS) the (RS) is subscripted in capital - 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)' - 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 - 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

1.1 Regional Settings - I suggest this is placed under methods or as study site - In line 20 and 21 you say '..to the south' and '..to the north.' of what? which area? i understand here but maybe its better you are more clear to avoid confusion - 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

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 it - i do not understand why you mention '.. bio-optical algorithms.' In line 11 page 1770? Is it given in L1B? Be clear and specific - line 24 it would be nice to know which version of ENVI you used - from line 20 to line 5 of page 1771 it would be nice to use numbered explaination instead of words '.. Firstly.... Lastly' the reader is likely to get lost

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

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second sentence please provide references to support the statement - In line 13 page 1771 it would be nice to know the accuracy of the device - In line 14 please provide the secchi disk specifications so that other peers can compare or be critic to your study - 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 simply reference Grasshoff et al. 1999 protocol on seawater analysis

3. Results and discussions 3.1 in situ measurements - A peer reviewed comparison would be nice for result of  $R^2$  in line 24 - 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'

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 - 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

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 - Page 1774 line 5 'the centre of Gulf ... higher...' why ?maybe explain or at least give reference. - Line 15 maybe better if you give reference to support your findings of 68.9%

3.2.2 2009 turbidity map - Line 19 page 1774 maybe use 'mean annual for 2009' - Why is there a small variability as explained in line 26 page 1774? - 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?

4. Summary and recommendation - Page 1775 line 14 do you mean relationship or something else by '..relation...' - Line 16 what do you mean by '..surestimation..' - Line 20 to 23 better rephrase

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Acknoledgements - 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 - 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

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

OSD

7, C466–C470, 2010

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