Dear Editor,

Thanks for the opportunity to review the manuscript titled, "Satellite remote sensing of water turbidity in Alqueva reservoir" by Potes et al. The manuscript addresses an issue that is very important and relevant to the lake water management community. The objectives are stated clearly. However, this manuscript is not ready for publication yet. There are some serious issues that the authors need to address before the manuscript can be considered for publication. The following are my comments describing these issues.

Comments:

Introduction:

A1. The *Introduction* has to be modified and restructured. The opening sentence ("Climate seasonality …") is vague. The first paragraph seems like a bunch of logically disjointed statements instead of a coherent paragraph with a clear logical progression.

A2. *Introduction* should be reasonably brief and its paragraphs should be placed in a logical sequence so that together they form a coherent unit without any repetition. This is the current layout of the *Introduction*:

- a logically disjointed first paragraph that ends with a definition/introduction of turbidity
- a paragraph that introduces satellite-based monitoring of optical properties of lake water
- a short paragraph that states the objective
- a paragraph that refers to previous work by the authors to retrieve biophysical properties of water using satellite data
- a paragraph that starts with a definition/introduction of turbidity (for the second time), and describes the need to include changes in lake properties in weather forecast models
- a paragraph that introduces the FLAKE model and discusses the benefit of using satellite data for estimating extinction coefficients of water, with a mention of the connection between turbidity and the extinction coefficient of water (this should appear next to the discussion of the Beer-Lambert Law)
- a paragraph that states the objective (for the second time)
- an outline of the sections to follow

The layout needs to be changed. The following is what I propose:

- a paragraph that introduces turbidity, its importance as a water quality parameter, and the need to monitor it
- a paragraph that discusses the challenges in conventional methods of monitoring turbidity and elucidates the advantages of satellite-bases monitoring (with a brief introduction of MERIS)

- a paragraph that introduces and discusses the inherent challenge of correcting satellite images for atmospheric effects and refers to the authors' previous work in implementing a 6S-based correction of MERIS data
- a paragraph stating the objectives of this work (the authors have referred to their objective as two-fold but it seems that there are three objectives, namely, (i) validation of the 6S-based atmospheric correction, (ii) development of a satellite-based algorithm to retrieve turbidity, and (iii) analysis of the sensitivity of a lake model to variations in turbidity
- a short paragraph the outlines the layout of the remainder of the paper

The Beer-Lambert Law can be mentioned in the section describing the authors' method for retrieving turbidity from satellite data.

A3. MERIS resolution is given as 300 m x 300 m throughout the manuscript. The correct resolution is 260 m x 290 m (http://envisat.esa.int/handbooks/meris/CNTR2.htm).

Data and Method:

B1. MERIS has been around for a number of years now and its data have already been extensively used by numerous researchers. Therefore, there is no need to describe the MERIS sensor in any detail here. It is sufficient to simply state that full resolution MERIS images were used, with a description of the criteria that were used to select the images.

B2. MERIS ATBD is not a suitable name to refer to the algorithm from Doerffer and Schiller (2008). ATBD is a general acronym for Algorithm Theoretical Basis Document (which describes the theoretical basis of an algorithm). A better alternative would be to refer to this algorithm as the 'MERIS Lake Algorithm' (or something like MERIS LA, if the authors want to shorten it).

B3. Figure 3 shows the comparison between measured Rrs values and the Rrs values retrieved from the three different atmospheric correction procedures. But Rrs is a spectral quantity, and therefore, the comparison should also have the spectral dimension. In other words, it is more interesting (and in fact necessary) to see how the comparisons look at different wavelengths across the spectrum. The spectral behavior of the comparison is a key factor.

B4. How were the statistics in tables 1 and 2 calculated? Were Rrs values summed up (or averaged) for all wavelengths and then compared between the measured values and the values retrieved from the three different atmospheric correction procedures? In any case, such spectrally summed/averaged values bear no significance. As stated in the previous comment, it is important to see the spectral behavior of the comparison.

B5. How come there are 89 data points for the MERIS L1 + 6S method but only 78 and 72 data points for the other two methods? Weren't the same images used for all three methods?

B6. In the 2nd paragraph on page 11367, the authors state that 17 data points were used for the development of their empirical algorithm for estimating turbidity. Why only 17 points were used instead of 89 points? It seems that the 89 points had already passed the criteria for selection. Why and how were these 17 points chosen from the 89 points?

General Comment:

The manuscript needs to be edited for its English. There are numerous instances of improper grammar and sentence structure. For instance, the last sentence in the *Abstract* needs to be rephrased to something like, "…tested in the form of a study of the sensitivity of a lake model to the extinction coefficient of water, showing that …". There are numerous instances such as this throughout the manuscript.