

## ***Interactive comment on “A study on distribution of chlorophyll- $\vec{a}$ in the coastal waters of Anzali Port, south Caspian Sea” by S. Jamshidi and N. Bin Abu Bakar***

**Anonymous Referee #1**

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General comments: The authors present a detailed description of the temporal and spatial distribution of chlorophyll a in the south Caspian Sea. Although this would be a useful data set to have in the literature, there are major issues with this manuscript that would need to be addressed before I would recommend publication (see specific comments below). In addition, the sentence structure is poor and needs to be improved before publication. I will not comment on grammar but recommend that it is improved prior to publication.

Specific comments: 1. Chlorophyll a is a photosynthetic pigment used by plants to capture sunlight for photosynthesis. The authors state (e.g. in the abstract and a few

C155

places throughout the manuscript), that chlorophyll a has 'severely damaging effect on the marine environment'. This is inaccurate and overstated. Chlorophyll does not directly damage the marine environment. Instead, it is the increase in particles during blooms (reduces light due to self shading), increase in organic matter that is then fed into the microbial loop, which can cause a rapid drawdown in oxygen. Therefore, it is the indirect effect of enhanced phytoplankton (and chlorophyll a) that can have a deleterious effect on the marine environment. This needs to be clarified in the manuscript.

2. An increase in chlorophyll a concentration does not necessarily mean an increase in phytoplankton biomass. Chlorophyll a concentrations increase with decreasing light levels (or an increase in the carbon to chlorophyll ratio) due to photo-adaptation of the cells (i.e. under reduced light conditions, phytoplankton cells need to produce more chlorophyll per cell in order to capture sufficient light energy for photosynthesis). This will be especially true in the subsurface chlorophyll maximum observed in this study, and also in surface waters during enhanced mixing and/or influx of particle-laden river waters. In addition, the chlorophyll content per cell is very much dependent on the species. For example, a large diatom cell may contain more chlorophyll than a small cyanobacteria cell. Do the authors know if any of the changes in chlorophyll concentration over a seasonal cycle is due to a change in species composition rather than an increase in one phytoplankton group? Inclusion of this information would improve this manuscript considerably.

3. The authors describe, in great detail, the sometimes small changes in the horizontal and vertical distribution of chlorophyll. This is very difficult and confusion to read. I suggest the authors restructure their results section to provide a broader (i.e. less detailed) view of how chlorophyll concentrations change. For example, is it possible to provide a mean  $\pm$  standard deviation for surface, subsurface chlorophyll maximum and bottom water chlorophyll concentrations for each transect, then compare these between transects that are near shore versus off shore? Then, it would also be possible to use statistical analysis to check if there are significant differences in chlorophyll

C156

between seasons and transects.

4. I suggest that the authors provide a table that lists the stations sampled, sea surface temperature, mixed layer depth, depth of the subsurface chlorophyll maximum and surface and subsurface chlorophyll concentrations. Do the authors have access to nutrient data for this area? If so, this would be a great addition to the manuscript.

5. The authors have not used a wider range of literature on shelf sea dynamics. I suggest the authors look at manuscripts published by Jonathan Sharples and Mark Moore, which focus on understanding the maintenance, persistence and composition of the subsurface chlorophyll maximum in shelf seas.

6. The authors state that chlorophyll has a damaging effect on the marine environment but do not state what the 'threshold' may be. From the data presented, do the authors have some idea on how high is too high? This could be useful to satellite oceanographers monitoring coastal regions for harmful algal blooms.

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Interactive comment on Ocean Sci. Discuss., 8, 435, 2011.