

Journal: BG  
Title: CO<sub>2</sub> maximum in the oxygen minimum zone (OMZ)  
Author(s): A.P. PAULMIER et al.  
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## **Anonymous Referee #2**

### **General comments:**

Herewith, I include the review of the manuscript “CO<sub>2</sub> Maximum in the Oxygen Minimum zone (OMZ)”. The objectives for this work was to study DIC and oxygen structures formed in the Chilean offshore and a discussion were developed for similar structures for other OMZs.

The analysis is base on 4 cruises between 2000 and 2002 and a monthly monitoring station to document spatial-temporal variations detailed in Paulmier et al. (2006). The author show OMZ off Chile associated with high DIC and define a carbon maximum zone (CMZ) over the whole OMZ thickness. The authors aloud that all OMZs form CMZs with similar biogeochemical characteristics. In my opinion the material regarding the relationship between OMZ with CMZ contribute to our understanding of the processes that occur in different OMZs. I suggest to be accepted for publication in "Biogeosciences" with some minor revisions.

### **Abstract:**

I suggest rewriting the last paragraph (up to lines 14) doing emphasis base in the result the main message and conclusion.

### **Introduction:**

It will be nice if the author Include more important details about Chilean rich DIC and Low oxygen water condition and about the Humboldt regions studies related with denitrification.

### **Methodology:**

I suggest adding more general detail about the approach about water mass analysis application. Author refers to the Paulmier et al., (2006) but can be useful for reader to see and resume on this the paper.

### **Results:**

#### **1) Figures recommendations:**

I suggest increasing the size label in all the figures. In addition the small figure designed inside the Figure 1f it's hard to see for size but also because not latitude and longitude axes were include. The authors refer in result to geographical position for example “*The DIC structure, observed at 21oS from the shelf to off-shore (Iquique: Fig. 1a and c) but also at 30oS*”. I also suggest for Figure 5 to change the font clear color for black (example slope and N values).

- 2) In page 6360 line 18: Writing fix, the format must be as “DIC<sub>Classical out of OMZ</sub>” but in the manuscript DIC is as superscript. The same mistake is located in line 9 from Fig.1 description.
- 3) In section 3 the last nine lines can be move to the methodology section. In these lines the author explains the strategy for the global scale analysis.
- 4) For section 3.2 related with CMZ-Global analysis, I suggest to move the description in how was done this approach to the methodology section.
- 5) In page 6361 line 3: The author refer a low DIC range of (between 1900 and 2100  $\mu\text{mol/kg}$ ) for OMZ's as a general values. However the values came from figure 1 from Chilean coast. I just suggest to specify that the range is an example (A value of  $\sim 2100$  can be the result of upwelling event in ETNP).
- 6) In page 6361 line 15-17: I suggest avoiding local processes as river input and instead can be considered a CMZ from BB in another station more comparable.
- 7) Page 6364 lines 9 to 27. I suggest to add a discussion for another zoom  $\sim 1000\text{m}$  where is much clearer the circulation effect and where the differences are more clear.
- 8) For section 4.2 in pages 6367-6369 I suggest to include a discussion about carbonate dissolution as an additional DIC source.